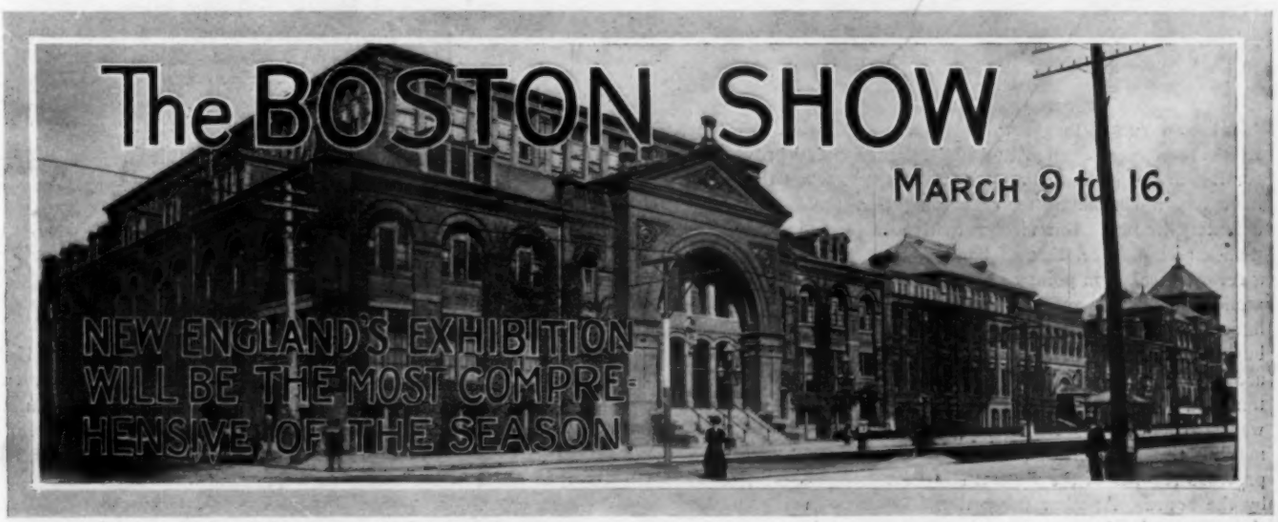
THE AUTOMOBILE

WEEKLY — NEW YORK—THURSDAY, MARCH 7, 1907—CHICAGO — 10 CENTS

VOL. XVI. NEW YORK—THURSDAY, MARCH 7, 1907—CHICAGO No. 10

THE AUTOMOBILE



BOSTON, March 7.—And, finally, of the big shows comes Boston, with its Fifth Annual Automobile and Power Boat Exhibition, housed in spacious Mechanics Building and overflowing into Horticultural hall, and even then not having enough room for all comers. From Saturday night next to the following Saturday night the New England patrons of automobiles and motor boats will attend in thousands, and the allied industries will benefit to the extent of thousands of dollars in sales.

"Bigger, Better, Busier Boston" was the slogan that landed Boston's energetic mayor, John F. Fitzgerald, in the coveted place in City Hall, and since the campaign his alliterative war-cry has become almost indelibly associated with the commercial activities of the Hub. The phrase cannot be applied with greater truth than to this fifth show of the Boston Automobile Dealers' Association. Each one of the adjectives by itself, or the three as a unit, describe the collection of motor vehicles for land, and power craft for sea that has been assembled for the edification of New Englanders next week fully and completely.

That the Boston show is "Bigger" than any of its historic or immediate predecessors, here or elsewhere, needs only a brief and cursory examination of the halls to prove. Every foot, every inch even, of the exhibition space in the great halls of Mechanics Building, the largest of its kind in New England, and of Horticultural Hall, has been sold. Late comers who, though they moved heaven and earth, could not buy or beg floor space have had to be content to show their products on the side walls or in the aisles. And they consider themselves lucky to be a part of the biggest automobile show of the country. The automobiles have even invaded the precincts of Paul Revere Hall in Mechanics Building, a handsome apartment whose polished floor is rarely revealed except for dancing purposes. That this hall might be used required several special meetings of the trustees of the buildings, and the bringing to bear of every possible influence by one of the oldest and largest automobile concerns in the country, which, through misunderstandings, had been shut out from obtaining space on the main floor. Up the avenue in Horticultural Hall the huge motor trucks look strange in the halls where the Boston public is accustomed to view rare orchids, roses and the other products of the best greenhouses of the State. More different makes of automobiles will be on exhibition at the Boston show than at either of the New York exhibits, and nearly, if not quite, as many as at the two combined.

That the show is "Better" than ever before cannot fail to be the verdict of the host of enthusiasts when it is admitted to the apple orchard and rose garden into which Manager Campbell has transformed the show buildings. Not only is the idea of the decorations unique, but it is effective, and the orchard in full bloom and the trellises loaded with roses, sheltering the mechanical masterpieces of the 1907 product of the automobile factories, cannot but delight the New Englanders who have been so badly buffeted about by the raw North winds this exceptionally cold and severe Winter. It will be like a jump forward of two months into the springtime atmosphere of early May. But it is not alone in its decorative features that the Boston show claims superiority. Its main claim rests on the fact that here, and only here, in the eastern half of the United States, can the season's progress in automobile construction be observed and studied at one time, in one place and without distinction between exhibitors. Selden licensees of years' standing, and the youngest comer from some local machine shop are aligned side by side and invite comparison. It is the boast of the management that nowhere east of Chicago is there so thoroughly representative an exhibition of motor vehicles as that which has been arranged for the delectation of New England people.

When it comes to the third adjective, "Busier," evidence, in its nature circumstantial, must be relied upon to prove the case, for it will not be until the end of the show, when the exhibitors have had a chance to figure results, that the business will be definitely known. But circumstantial evidence is often stronger than direct, and all that at hand points to the Boston show as a record breaker in point of attendance and sales. Since the 1907 models made their appearance three months ago, the local dealers have been conducting a strenuous campaign, and many are the buyers whose appetites for motoring have been whetted by the accounts of shows in other cities and by demonstrations in Boston, and who have been brought to the point where they just want "to look 'em over" once more before signing the order and making the deposit. There are so many of these that all the previous records of the Boston show for business are likely to go by the board. Another thing that has always made the Boston show noted for its sales, is that the spring riding season is only a few weeks away, and even the most inexperienced know that if they wait any longer the 1908 models will be out before they have a chance to ride in their 1907 cars.

Why the Boston Show Is Held in the Spring.

It has often been said, particularly within the past year, that the Boston show ought to be earlier in the season, and the change has been advocated to some extent. It is claimed that the show now comes in the midst of the selling season and interrupts business for a couple of weeks just when the dealers need their time for giving attention to customers. It is also claimed that being so late it keeps purchasers from placing their orders and makes deliveries late. This argument, of course, has some weight, but the great fact remains that in Boston and at the Boston show the dealers come in contact with the purchasers, instead of the factories with agents. It is in no way an agent's show, though more or less agency work is done. It is a show that is retail rather than wholesale in its character; and, therefore, its closeness to the open riding season is an advantage, for purchasers do not want to put up their money or receive their car any earlier than necessary before they desire to make use of it.

At the opening of the show this year it is planned to have some little ceremony. The Boston management cannot get the diplomatic corps from Washington to grace the affair, and it has not invited the President, but it will have some of the prominent men in the automobile line on hand for the preliminary opening. Nothing elaborate will be attempted, but there will be a select few who will get a glimpse of the apple orchard before the great Saturday night crowd is admitted. This is an innovation, as heretofore the doors have been thrown open to all at the appointed hour and when the thousands got ready to leave the building it required all day Sunday to put it in presentable condition for the real interested parties who make it a point to stay away from the opening night. The real opening will take place at 8 o'clock Saturday evening, but beginning Monday the doors will be open from 10 o'clock in the forenoon until 10 o'clock at night. One ticket will admit to all departments of the show.

STATISTICS THAT TELL OF ITS BIGNESS.

According to Manager Chester I. Campbell, the following statistics illustrate how great will be Boston's fifth show. The Paris Salon figures somewhat spoil the leadership in the accompanying statistics, and so nothing is said of the French affair.

The Number of Exhibitors.

A. C. A. Show, Grand Central Palace, New York, December, 1906	230
A. L. A. M. Show, Madison Square Garden, New York, January, 1907	249
Chicago Show, Coliseum, February, 1907	270
London Show, Olympia, December, 1906	290
Boston Show, March, 1907	342

Individual Makes of Automobiles.

A. C. A. Show, Grand Central Palace, New York, December, 1906	85
A. L. A. M. Show, Madison Square Garden, New York, January, 1907	45
Chicago Show, Coliseum, February, 1907	96
Boston Show, March, 1907	121

Total Number of Cars Exhibited.

A. C. A. Show, Grand Central Palace, New York, December, 1906	251
A. L. A. M. Show, Madison Square Garden, New York, January, 1907	238
Chicago Show, Coliseum, February, 1907	359
Boston Show, March, 1907	423

NEW CARS AT THE BOSTON SHOW.

Though the closing event of the show season held at the Hub has always been productive of novelties in the shape of new entrants into the field of automobile builders, this has seldom, if ever, been the case to the same extent as will mark this year's show. Gasoline, steam and electric cars are all represented. No less than eight of the first-named type will make their debut.

These are the Bay State Forty, Bay State Automobile Company; the Bailey, Bailey Automobile Company; the Aurora, Brown Motor Car Company; the Gearless, two-cycle and four-cycle, Gearless Transmission Company; the Holmes, Holmes Motor Vehicle Company; the Heyman, Edward Heyman; the Mason, Puritan Motor Co.; and the Broubot, K. A. Skinner.

The Clark steamer, built by Edward S. Clark, is the sole new representative to appear in this class, while in the electric field there are the Bailey, S. R. Bailey & Company, Inc.; and the Boston, made by the Concord Motor Car Company.

A SHOW LAUNCH WITH FEATURES.

One of the Maine exhibitors will show in the boat department a launch built expressly for a young woman who has attained a wide reputation as a daring racer of motor boats. The launch is built on very graceful lines, of approved design, and has many noticeable features, one particularly, which the women will admire, is the enclosed engine, as no motor is in sight, and all danger of a woman's skirt becoming entangled in the moving parts of the machinery is eliminated.

WHY THE BOSTON SHOW IS A NECESSITY

WITH the rapid spread of the automobile show idea throughout the country, until every city where there are a few agencies, is clamoring for a show and the agents are asking the manufacturers to help them out by supplying show cars, it is no wonder that the manufacturers are much disturbed at the prospect, and look with favor on the suggestion to limit the number of shows to the so-called national exhibitions in New York and Chicago. Boston representatives who have been called upon by their agents in other New England cities to supply cars and help out at the local shows can sympathize with the manufacturers to a certain extent, for these small shows require very much time and do not yield an adequate return. When it comes to a suggestion that the Boston show be eliminated, the Boston and New England dealers, however, are at once in arms, for they believe that the annual Boston show is as necessary from an industrial standpoint as are the New York and Chicago shows. New England people, they argue, cannot be forced to go to New York to select their cars, especially when, in order to see all the machines, two trips would be necessary. Furthermore, the Boston show has always been a big seller, and as a means of arousing enthusiasm for automobiling and as an agent of publicity is unequaled.

There is, however, among the Boston dealers, a feeling that while it is better to have the Boston show in the late rather than the early Winter, as it is in effect a retail show, business being done between agents and owners, rather than between manufacturers and agents, it might be a good plan to advance the date a few weeks so as to bring the show into February, having it come a little nearer after the Chicago show. The middle of March as a show time is a little too late, for it comes just in the midst of the selling season, and tends to delay orders, and in consequence make deliveries late. The movement for an earlier show has not taken definite form just yet, but there is a possibility that when the Dealers' Association gets ready to make its preliminary plans for the 1908 show, it may decide to have it in February instead of March.

As the Manager of the Shows Looks at It.

Speaking of the place in the industry occupied by the Boston show, Chester I. Campbell, who has managed the Boston show for the past three or four years, said:

"The Boston show is entirely different from the national shows in New York, but has as important bearing on the industry in its way as the earlier exhibitions. The Boston show is not for the purpose of giving the manufacturers a chance to show their agents the new product and to place new agencies, nor is it to give the agents an opportunity to become familiar with the cars for the coming season. On the contrary, our show is to instruct individuals and prospective owners. It is essentially a retail show, so to speak; it comes too late for agency business. The people who have made up their minds just what car they want may buy earlier, but there is always a great host that is undecided, and the Boston show creates enthusiasm among these. We have considered the question of holding the show earlier in the season, and while there is some feeling among the members of the Automobile Dealers' Association in favor of an earlier show, I do not think that the majority would want it much earlier than at present. It might be advisable to move back the date to the middle of February, providing we could secure the halls for that time, but no earlier. Even in February there would be less chance for demonstrations, which are an important part of a show held primarily for those who are going to buy cars for their own use and drive them. The importance of the Boston show from an industrial standpoint is best demonstrated by past results. Sales have always been very large and the attendance remarkable, while in point of space the Boston show is the largest in the country. We have already received sixty applications for space in the 1908 show and it is not at all improbable that we will have to separate the motor boat show in another year in order that there may be sufficient space for the growing number of automobiles."

According to the Treasurer of the Association.

Harry Fosdick, who has been an automobile dealer in Boston ever since the trade was concentrated in two or three types of steam buggies, and who is now treasurer of the Dealers' Association, is enthusiastic over the advantages of the Boston show.

"The manufacturers may call our show local, but it is as much national in effect as the Chicago show. If the show were omitted the manufacturers would hurt themselves as much as the local dealers, for the New England trade is a large one and important. Boston and New England people do business different from the way it is done in New York. In that city sales are made quickly; here the buyer wants to investigate thoroughly and be sure of what he is getting before he pays his money. He doesn't buy on the spur of the moment and therefore doesn't like to buy in New York. Besides, New England people take an interest in things in Boston and will come here from Maine, Vermont and New Hampshire; Boston sets the style, so to speak. Some Boston people go over to New York, but they go to get ideas, and don't buy there to any extent. Our show might be a little earlier, perhaps, but it occupies a peculiar place in the industry; it is a place where actual business is done and as such does not need to be so early as the shows where the larger part of the sales are by the manufacturers to their agents."

From the President of the Association.

J. H. MacAlman, president of the Dealers' Association, when asked for his opinion concerning the industrial importance of the Boston show, said:

"The anxiety of the manufacturers to secure space in our show and its growth in the past two or three years are proof enough, if any is needed, of the high place the Boston show holds in the estimation of the manufacturers. We are absolutely unable to accommodate all who have applied to us for exhibition sp this year. Boston is one of the largest automobile centers in country and Boston people demand an exhibition where they ca see all the cars before deciding which they will buy. The Boston show is a retail exhibition for New England. The New York shows come at a time when all the cars are not ready and the product that is shown is more in the nature of machine shop cars. The cars at the Boston show, on the other hand, are the manufactured product ready for delivery from the floor. The attendance and sales of the past shows indicate clearly that Boston people are ready and willing to support a show and are anxious to see the cars."

The Opinion of the Vice-President.

George H. Lowe, vice-president of the Dealers' Association, has been in the New England trade since the automobile made its first appearance, and he has had more or less to do with Boston show promoting since it began. He commented in this vein:

"To my way of thinking, the Boston show is an absolute necessity to the automobile trade of New England. There are many down Easters who have neither the time nor the money to make the long trip to New York, but they desire to look over all the cars, even though they select a later model of the cars which they might be driving. In point of immediate results, it is pretty safe to say that the Boston show results in the sale of more cars than any other exhibition held in the country. People certainly come to the Boston Show for the purpose of buying, and in the majority of cases the experienced expositors see to it that they do not go away empty-handed. And New Englanders are cautious buyers."

HISTORY OF BOSTON AUTOMOBILE SHOWS

IT is so long since Boston had an unsuccessful automobile show that most of the people who crowd their way into the big Mechanics Building this year will probably have forgotten all about it. Some of them will recall that the big shows previous to last year were given in Symphony Hall, farther up the avenue; but they will remember the Symphony Hall shows merely as good displays that proved tremendously popular with the show-going public and automobile enthusiasts of all sorts.

The fact is, automobile shows in Boston beginning with that of 1903 have been remarkably successful. They have needed no apologies, even on the score of lateness in opening, for the Boston public has shown itself perfectly ready to wait until March for a look at the local offerings, regardless of the fact that new models have usually been seen and discussed pretty generally at the big shows in New York and Chicago, earlier in the year.

One new thing about the show in Boston this year is the organization back of it. Since last year's exhibition a reorganization has been effected, and this year's show is given under the auspices of the Boston Automobile Dealers' Association, Incorporated, instead of the Boston Automobile Dealers' Association.

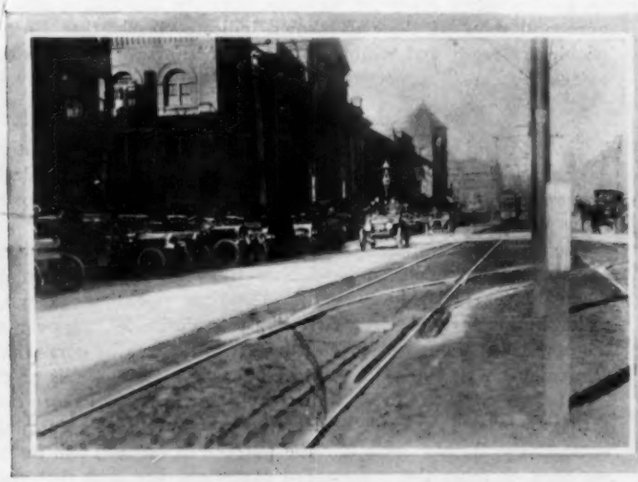
But to get back to the last unsuccessful show: It was in Mechanics Building, in 1903. It failed of success because of a split between the local automobile clubmen and the dealers. All hands started early in the winter to work together for a show; but when it developed that each faction wanted to be the guiding influence, the parties separated. The clubmen, organizing what was known as the New England Automobile Association, gave a show in the main hall of Mechanics Building in February, at the same time that the New England Kennel Club's dog show occupied Exhibition hall, in the same building. But most of the dealers held back their cars for the dealers' show, which was then planned for Symphony Hall in March; and the result was a meagre display of vehicles at the club show, and the substitution of "stunts" on the broad floor instead of an exhibition of new-model autos.

The show of the dealers, in March, proved doubly successful on account of the fiasco in February; the gate receipts were in excess of the dealers' wildest anticipations, and dealers and public were alike gratified. Another successful show was given in Symphony Hall in 1904; but thereafter more room was imperative, and the dealers moved down to Mechanics Building in 1905, taking the whole building with such success that they have continued there until the present season, with a show each March. Meanwhile, certain dealers had a rival show in Symphony Hall in show week of 1905, and last year Symphony Hall was used in the show week for an exhibition composed largely of imported cars—virtually an overflow exhibit of cars crowded out of Mechanics Building. Horticultural Hall has been used each year for a power boat show, except last year, when the power boats were in the basement of Mechanics Building.

Early automobile shows in Boston were always in conjunction with some other and larger exhibition. The first was an adjunct to the Mechanics Fair, so-called, or customary exhibition of the Massachusetts Charitable Mechanics Association, in Mechanics Building. It was given in November, 1898, and while the main floors of the building were occupied as usual in the Mechanics Fair by all sorts of machinery, a section of the basement was given especially to automobiles. This section was visited by many persons interested in the automobile as a novelty, but it attracted little popular notice. The Charitable Mechanic Association, however, did much to stimulate interest among inventors of that day by offering $1,100 in prizes for automobile events given one afternoon during show week at the Charles River Bicycle Park, near the Cambridge end of the Harvard Bridge.

Subsequent automobile shows in Boston were merely small displays in connection with industrial shows or food fairs until 1901. In that year a company of professional show promoters came to town prepared to run a big automobile exhibition and reap a harvest. They engaged Mechanics Hall; but they charged such amounts for floor space that comparatively few manufacturers or dealers cared to bid for popular favor through their show, and as a result the exhibition was a fizzle. The public did not attend in large numbers and those who went saw comparatively few machines.

Partly to overcome the ill effect of this show on the public mind, the dealers and the members of the newly-formed automobile club in 1902 joined with the promoters of a big fair that was to be held in Mechanics Building, and arranged for an automobile section. All hands, dealers, clubmen and users of commercial vehicles, joined to make this exhibit a good one; and for a small show it was a pretty good success. One of its interesting features was a street parade, starting from the Mechanics Building and touring the business and financial districts in mid-forenoon. The 1902 show was the first to convince the public that steam, gasoline and electric cars were all being developed successfully; and it paved the way to the enlarged public interest that has been in evidence at all shows since that year.



BOSTON'S 1906 SHOW OPENED WITH IDEAL WEATHER.

LATER A SNOWSTORM MADE DEMONSTRATIONS DIFFICULT.

THE EXHIBITORS OF THE 1907 BOSTON SHOW

THOSE WHO WILL SHOW GASOLINE CARS.

Exhibitor.	Exhibit.	Space.
Butler Motor Car Company	Pierce Racine	1
Butler Motor Car Company	Cleveland	1
Butler Motor Car Company	Rapid	1
Butler Motor Car Company	Rapid Commercial	304, 305
Boston Automobile Exchange	Crawford	12
Bay State Auto Company	Bay State Forty	69
Bay State Auto Company	Queen	241, 244
Boston Motor Company	Pungs-Finch	91
Boston Motor Company	Acme	92
Buck & Price Company	Rainier	93
Bond Bros. Company	Deere	99
Berkshire Auto Company	Jackson	106
Blake, E. P., Company	Logan	107
Blake, E. P., Company	Berkshire	110
Blake, E. P., Company	Logan Truck	318
Blake, E. P., Company	Logan Light Delivery Wagon	318
Bailey Automobile Company	Bailey	311
Brown, George M.	Apperson	330, 331
Curtis-Hawkins Company	Grout	42
Columbia Motor Vehicle Co.	Columbia	61, 62
Crown Motor Car Company	Gilde	88
Crown Motor Car Company	Aurora	88
Concord Motor Car Company	Compound	90
Castle, H. C. & C. D.	Lozier	89
Coburn-Heath & Company	Cameron	108
Coburn-Heath & Company	Triumph	108
Commercial Truck Co., America	Commercial Trucks	303
Consolidated Mfg. Company	Yale-California Motor Cycle	116a
Crouch Motor Company	Crouch Motor Cycle	174
Dunham, Geo. J.	Royal Tourist	3, 7
Dingle, Witherbee Company	Crawford	12
Dragon, The Auto Company	Dragon	111
Dodge Motor Vehicle Company	Pope Toledo....Paul Revere Hall	
Dodge Motor Vehicle Company	Pope Hartford..Paul Revere Hall	
Dodge Motor Vehicle Company	Pope Tribune..Paul Revere Hall	
Eaton, Chas. A.	Lambert	279
Fuller, Alvin T.	Packard	13
Fuller, Alvin T.	Cadillac	17
Fosdick, Harry, Company	Thomas Flyer	56
Fosdick, Harry, Company	Thomas Forty	57
Franklin Auto Company	Franklin	59
Ford Motor Car Company	Ford	65, 66
Fredericks, W. A., Company	American	96, 97, 98
Grout Bros. Automobile Co.	Grout	42
Gearless Transmission Company	Gearless	221
Hol-Tan, The, Company	F. I. A. T.	60
Henshaw Motor Car Company	Haynes	79, 80
Harrison Wagon Company	Harrison	83
Holmes Motor Vehicle Company	Holmes	95
Hub Auto Exchange	Crest	273
Heyman, Edward	Heyman	280
Jenkins, W. M. & Company	Mitchell	24
Jeffery, Thos. B. & Company	Rambler	53, 54
Kimball, E. T., Company	Corbin	44, 45
Knox Motor Truck Company	Atlas	306
Lowe, Geo. H., Company	Aerocar	11
Locomobile Company of America	Locomobile	73, 74
Linscott Motor Company	Wayne	100, 101
Linscott Motor Company	National	102, 103
Linscott Motor Company	Reo	104
Litchfield, Everett S.	Austin	109
Maguire, J. W., Company	Pierce Great Arrow	14, 15
Mills-Kennedy Company	Welch	23
Mills-Kennedy Company	Springfield	23
Matheson Motor Car Company	Matheson	25, 26
Maxwell-Briscoe-Boston Co.	Maxwell	63, 64, 81
Morrison, A. E., Company	Stearns	67
Morrison, A. E., Company	Oldsmobile	68
Morse, Alfred Cutler, Agent	Panhard	94
Metropolitan Automobile Co.	Moon	310
Napier Motor Co. of America	Napier	55
Northern Auto Agency	Pennsylvania	76
Northern Auto Agency	Pullman	76
Northern Auto Agency	Northern	76
Nichols, D. P., & Company	Frayer-Miller	222, 223
Prentiss Motor Car Company	Studebaker	15
Park Square Auto Station	Berliet	41
Peerless Motor Car Company	Peerless	70, 71
Panhard & Levassor Auto Co.	Panhard	94
Parker, F. R., & Company	Elmore	113
Puritan Motor Company	Dolson	307
Puritan Motor Company	Mason	307
Reed-Underhill Company	Knox	6, 10
Randall, Frederick E.	Stevens Duryea	20, 21, 22
Royal Automobile Company	St. Louis	78
Reed-Underhill Company	Knox Truck	300
Reliance Motor Car Co. Agency	Reliance	309
Smith, Fred S.	Autocar	16
Stratton, H. C., & Company	American Mercedes	16
Stratton, H. C., & Company	De Luxe	49
Stratton, H. C., & Company	Kissler-Kar	46
Squier, Geo. C.	Premier	75
Sturtevant Mill Company	Sturtevant	77
Stranahan-Eldridge Company	Buick	85, 86, 87
Skinner, K. A.	De Dion Bouton	202
Skinner, K. A.	Brouhot	202
Shawmut Motor Company	Shawmut	112
Sumner, B. D.	Commercial Truck	303a
Winton Motor Carriage Co.	Winton	4, 5
Whiting, H. E., Automobile Co.	Mora	39
Whitney, C. F.	Stoddard-Dayton	40
Wing, Frank E.	Marmon	50, 51
Waltham Manufacturing Co.	Waltham-Orient	82

STEAM CARS AND THEIR SPONSORS.

Boston Auto Livery	Ambulance 105	Stanley Motor Carriage Co.	Stanley 2
Clark, Edw. S.	Clark 84	White Sewing Machine Co.	White 5, 9
Ross, Louis S.	Ross 47		

ELECTRICS HAVE THE FLOOR AT THESE STANDS.

Babcock Electric Carriage Co.	Babcock 43	Prentiss Motor Car & Supply Company	Studebaker 15, 312
Bailey, S. R. & Company, Inc.	Bailey 117a	Rauch & Lang Carriage Co., The	Rauch-Lang 115
Columbia Motor Vehicle Co.	Columbia 62	Sumner, B. D.	Commercial Trucks 303a
Fosdick, Harry, Company	Baker 56	Concord Motor Car Company	Boston 90
Henshaw Motor Car Company	Columbus 80		

MAKERS AND DEALERS IN MOTOR BOATS, ENGINES, AND ACCESSORIES.

Exhibitor.	Space.
Aero & Marine Motor Co.	260
American Gas Motor Co.	266a
Atlantic Co., The	198, 199, 200, 201
Buffalo Gasoline Motor Co.	219
Boynton's Imp. Oil Clothing Co.	250b
Brownell-Trebert Co.	254a
Bridgeport Motor Co.	254b
Broadhead, W. H. & Co.	259
Bath Marine Construct'n Co.	275
Briggs & Wade	281
Binney, Arthur	282
Burgess, Hollis, Agt.	206a
Cramp, Wm., & Sons Ship & Engine Building Co.	218
Chandler & Farquhar Co.	235
Cutter, Wood & Stevens Co.	238
Chase Motor Co.	265c
Cooley Mfg. Co.	278
Detroit Engine Works	242
Detroit Boat Co.	243
Davis, F. E.	283
Emerson, Joseph B.	212
Emmons, E. Gerry, Corp.	220, 231
Electro Radiation Co.	254c
Emery, V. J.	268
Essex, The, Engine Co.	285
Fay & Bowen Engine Co.	206
Forbes, Walter J.	258, 265
Fairbanks, The, Co.	276, 277
Ferro Mach. & Fdy. Co.	289
Gray Motor Co.	256
Gulliford, Geo. A.	262
Hanna Machinery Co.	326
Holmes, The, Motor Co.	230
Hodgson, E. S.	263
Harvard Marine & Auto Co.	284
Hurd, A. W.	292
Ideal Gas Engine Co.	268a
Jager, Charles J., Co.	274
Lamb Boat & Engine Co.	261
Metropolitan Canoe Co.	212
Manufacturing Equipment & Engineering Co.	232
Morse, A. S., Co.	236, 237
Michigan Steel Boat Co.	239
Moore, C. Frank	256
Murray & Tregurtha Co.	257, 301, 302
Michigan Wheel Co.	288
McClellan, Chas. P.	207
Norfolk Motor Co.	210a
Norton Company	234
Poyen, John S.	196, 197
Progressive Mfg. Co.	203, 204
Poole & Price Mach. Co.	210a
Palmer Brothers	253
Plug Umbrella Co.	266b
Perkins Launch & Motor Co.	291a
Racine Boat Mfg. Co.	210, 211
Richardson Engineering Co.	250a
Rathburn-Lacy Co.	265b
Stamford Motor Co.	326a
Stuart-Howland Co.	251
Stanley, The, Co.	264
Small Brothers	261
Sterling Engine Co.	266
Sterling Mfg. Co.	267
Standard Engine Co.	282
Stuart, John, Co.	264a, 273a
Termaat & Monahan Engine Co.	252
Toppan Boat Mfg. Co.	269, 270
Terry, Geo. H., Co.	261
Tuttle, D. M., Co.	265a
Truscott Boat Mfg. Co.	271
Wells, A. E., & Son	286
Western Launch & Engine Works	290

EXHIBITORS OF AUTOMOBILE ACCESSORIES.

Auto Goods Company.....117c
Atlas Manufacturing Co...107aa
Adwear Auto Tire Sleeve Co.127
Aetna Life Insurance Co.....132
Acetyvone Company.....166
Atwood Manufacturing Co...173
Auto Appliance Company..179b
American Metal Polish Co...185
Aseptic Drinking Cup Co....190
American Electric Novelty & Manufacturing Co.....124, 125
Angier Company..... 52

Bowser, S. F., Co., Inc..... 49
Bay State Hardware Co.....214
Boynton's Imp. Oil Clothing Co. 260b
Boston Auto Gage Co.....290a
Bullard, J. H.....126
Badger, E. B., & Sons Co. 154, 155
Boyd, F. Shirley.....138a
Burmester Rubber Co.....176
Baldwin Chain & Mfg. Co...177a
Bell, The Wm. G., Co.....178
Bemus, T. Alton, Co., Inc..179a
Bennison Co.....H special
Broome, L. H.....189
Byrne-Kingston & Co.....195
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TO TAX AUTOISTS FOR ROADS BUILDING?

NEW HAVEN, CONN., March 3.—A bill for the bonding of the State for a large sum for the building of a comprehensive system of highways is now before the Connecticut legislative committee on roads, bridges and rivers. Those in favor of this measure state that this would not impose so much of a burden on the taxpayers of the State as would appear at first view.

Representative Charles G. Allerton, of Middlebury, Conn., house chairman of the committee on roads, bridges and rivers, is in favor of a bill taxing all automobiles in the State. In explaining his proposition to a representative of THE AUTOMOBILE recently, he said:

"The bonding of the State, say for $5,000,000, to meet the expense of building an efficient system of highways would entail practically no burden on the people of the State and the result would be of inestimable benefit to rural communities. A small and just tax on all automobiles would pay the bill. There is nothing unreasonable in asking some return from the owners of automobiles driven for pleasure for the use of our highways.

"There is now, I learn, 400,000 horsepower in automobiles in use in this State. If a tax of say 50 cents a horsepower were levied on the owners, $200,000 a year could be raised which would pay the interest on $5,000,000 worth of bonds. No one would be hurt badly by this scheme and the good roads question would be solved."

Mr. Allerton, being a successful farmer in Middlebury, thoroughly appreciates the value in facilitating the marketing of farm products by good highways. He has devoted considerable thought to the subject and is of the opinion that the bonding of the State and the taxing of all automobiles used for pleasure only is the best solution of this problem.

GOVERNMENT DOING LITTLE FOR ROADS.

WASHINGTON, D. C., March 2.—Logan W. Page, director of the Office of Public Roads, recently appeared before the Committee on Expenditures in the Agricultural Department and gave the members considerable information about the work being done by his bureau. He stated that one of the most difficult problems which road builders have to meet now is due to the greatly increased automobile traffic on the roads. It is affecting most the States that have spent the most money on their roads, because they have the greatest number of automobiles on them. Mr. Page stated that "with an ideally constructed stone road you have just enough wear, or, in other words, the qualities of the rock should be so adjusted to the traffic to which it is subjected that just enough fine dust is worn off to cement the larger fragments of stone together. Now, the automobile does not wear off any fine dust. The wind and rain are taking away the original binder, and that derived from the iron-tired vehicles that go over it; that is washed off and blown off, and the automobile loosens the surface of the road. These heavy machines going at high speed create a vacuum behind them which sucks up the dust and throws it into the air, thus loosening the roadbed, and it soon 'ravels,' as the road builder calls it—gets loose and goes to pieces—and it is the expensive roads that are affected most."

Director Page informed the committee that he and his staff must get means for meeting this problem, and they are making experiments with every known material that they thought will accomplish the desired end. He further stated that the interest taken everywhere is very great, and made this significant statement, that did not go unheeded: "The Agricultural Department is teaching the farmers how to kill wolves and how to get better crops, but we are doing scarcely anything to improve the roads."

STATUS OF THE AUTOMOBILE IN NEW ENGLAND

By C. F. MARDEN.

NEW ENGLAND is recognized by automobilists everywhere as one of the best touring districts in the country; if any proof were necessary it could be found in the fact that the last two contests for the Glidden trophy, the great national touring event, have entered New England. The district has better roads than can be found in any other six States in the Union; it is better equipped with hotel facilities, and automobilists are treated better than in most other places. In addition to this are its great natural advantages. It is difficult to find a more pleasant destination for a tour than the White Mountains, which have come to be very popular with automobile owners in the past two or three years, due partly, perhaps, to the hospitality of the hotelkeepers and their efforts to make things interesting.

It is no wonder, then, that automobiling in New England has made such giant strides forward. It is conservatively estimated that there are registered in the six States in New England nearly 30,000 cars. If this is a correct estimate, then New England has nearly 20 per cent. of all the cars registered in the States which have registration laws. According to the latest statistics available, there were 26,377 automobiles registered in the New England States. Massachusetts was in the lead with 17,299, Connecticut second with 3,900, Rhode Island third with 1,714, Maine fourth with 1,364, New Hampshire fifth with 1,253, and Vermont last with 847. These figures were made up some time ago, so that it is likely that a total of 30,000 cars in the six States is nearer correct at the present time.

In the organization of automobilists also New England is well to the fore, and few States can boast as many clubs as there are in these States. Massachusetts alone has not less than half a dozen well organized clubs. Among these are the Massachusetts Automobile Club, Bay State Automobile Association, North Shore Automobile Club, Worcester Automobile Club, Fitchburg Automobile Club, Springfield Automobile Club, and others of lesser importance. Maine has a club at Portland, New Hampshire a flourishing organization at Manchester, Rhode Island the Rhode Island Automobile Club, and Connecticut several organizations in the larger cities.

Though there seems to be a tendency to swing the national competitive events away from New England in 1907 to satisfy the clamoring of the growing West, New England has always been prominent in these affairs, being represented by several citizens in touring contests ever since the famous Pittsburg mud run. New Englanders were prominent in the first Glidden tour from New York to the White Mountains and return, and in the tour last summer from Buffalo to the same destination.

In racing, too, New England has set the style. One of the first race meetings in the country was that at Newport, when William K. Vanderbilt, Jr.'s *Red Devil*, John Jacob Astor's steamer, Kenneth Skinner's motor tricycle and an electric car were the contestants in the free-for-all that was the final event on the programme of the races on the half-mile Aquidneck Park dirt track. Few more successful track meetings have been held anywhere than those at the Peadville track, near Boston.

It is as a manufacturing center alone that New England has to give place to other sections of the country. Less favored by proximity to the sources of supply, by labor and by transportation conditions, than some of the States of the Central West, the manufacturing of automobiles has not grown as fast here as in other places. Yet some of the best known cars in America come from the six States in the northeast corner of the United States. Such cars as the Columbia, the Pope-Hartford, the Locomobile, the Knox, the Stevens-Duryea and the Napier are manufactured in New England, and in a summary of production the output of these factories would give New England a not inconspicuous place in the industry.

As a selling community New England is one of the best, standing second only to New York, and its possibilities have as yet not been fully developed. Boston has been exploited to a considerable extent and probably has more automobiles per capita than most of the larger cities, but there is a large territory in Maine, New Hampshire and Vermont that is only now being opened up. Boston dealers are reaching out into these States, establishing agencies and preparing for a campaign which, during the next year, is likely to largely increase the number of cars in use in these States. The future of the industry has no more promising field than the above territory.

INDICATIONS OF EARLY SPRING IN NEW ENGLAND.—A CORBIN UPON A MODEL CONNECTICUT HIGHWAY.

THE FLOURISHING AUTOMOBILE CLUBS OF BOSTON

CLUB life of Boston automobilists has had two periods of almost kaleidoscopic change. The earliest was in the days when the possibility of getting motorists enough together to carry on a respectable organization first made itself evident. The second was within the last three years after the big local shows had stimulated enthusiasm.

The club idea first spread to Boston in 1900. It came as a unit, but it found two factions of automobile enthusiasts waiting to appropriate it. One wanted to turn it to the building of a comfortable clubhouse in the country; the other saw no sense in any kind of a club unless it established an "automobile stable," as they called it in those days, in the midst of the city. The first aggregation developed into the old New England Automobile Club; the other organized the old Massachusetts Automobile Club.

They were rivals in about everything, at the start. The New England got in first with its organization—October 8, 1900—but was not incorporated until January 11 following; whereas the Massachusetts had the foresight to organize as a corporation at the start, thus antedating the other on the official records with a charter dated October 31, 1900. The Massachusetts had J. Ransom Bridge for president, Conrad J. Ructer for treasurer, and L. E. Knott for secretary. The New England's leaders were Arthur W. Stedman as president, Francis R. Hart as vice-president, George McQuesten as secretary, and Royal R. Sheldon as treasurer. The Massachusetts had on its original Board of Governors, Capt. Homer W. Hedge, John Brisben Walker, Jr., Ernest Rueter, Dr. W. A. Rolfe, and others; while the New England's executive committee included such enthusiasts as F. E. Stanley, Knight Neftel, Henry Howard and C. L. Edgar.

Both organizations were keen after a clubhouse, but the New England, composed very largely of members of the Country Club of Brookline, managed very soon to get control of the house and grounds of old Suburban Club, a driving club, in the heart of Brookline just across the road from the Country Club park; and with a housewarming here on February 22, 1901, the New England inaugurated a brief but active career. Its activity was largely confined to the ensuing season, when it had the distinction of running the first automobile race meet ever attempted east of New York, and on June 16, the day after this meet, had the first big club run, which was from Brookline to Marblehead and return. The race meet took place on the Country Club half-mile oval track.

The Massachusetts club had the biggest club run ever held in this State, so far as mere stringing out of vehicles is concerned, on June 17, when the club got together automobiles and their owners from all parts of the district and ran from Boston to Sharon. What a string of sixty or seventy autos can do in the way of raising a dust on a hot June day was shown so conclusively at that time that nobody in Boston has ever attempted that kind of a club run since.

The Massachusetts Automobile Club.

Events of that summer, however, showed that while the two clubs might own to slightly different ideals, their objects were in fact about the same; and in the fall they got together, buried the hatchet, and formed a new organization under the name of the Massachusetss Automobile Club, with Col. James T. Soutter as president, Elliot C. Lee as vice-president, Dr. J. C. Stedman as second vice-president, Royal R. Sheldon as treasurer, Dr. F. L. D. Rust as secretary, and A. W. Stedman, C. J. Glidden, George McQuesten, Henry Howard, J. R. Bridge, Newton Crane, Dr. W. A. Rolfe and Ernest Reuter as directors. Plans for a city clubhouse were at once drawn up; the building was pushed to completion; and on the evening of January 1, 1902, there was a splendid housewarming. This clubhouse is on Boylston street, with garage on the first floor and basement; club parlors, billiard rooms, and dining-rooms on the second floor; and repair rooms on the third floor. As a convenient place for storing cars the club has always been prosperous, and this feature of its activity increased so rapidly after the first year that in 1904 the three-story brick building on Boylston street was enlarged to three times its original size, and provisions made for caring for a largely increased number of automobiles.

Flourishing Life of the Bay Staters.

The Bay State Automobile Association came into being in January, 1905, with the idea of benefitting all users of motor vehicles with merely nominal expense to individual members. The social features of automobile ownership were to be kept well to the fore, yet it was also intended to foster the good roads movement, to give conservative protection against drastic legislation, and to work for rational rules and regulations governing the use of all classes of cars.

The first headquarters were a pleasant and convenient suite of rooms on the ground floor of the Hotel Lenox, about a minute's walk toward Copley square from the house of the Massachusetts Automobile Club. But as the season developed, the club members began to interest themselves in club runs and racing plans; they became eager for a house in the country. They had successful race meets at Readville that first year, with club runs to Rye Beach and other places. On December 1 the association took possession of what was known as the Annex of the old Woodland Park Hotel, at Auburndale; and in those quarters they enjoyed all the comforts of a well-equipped clubhouse, with the hotel to supply the dining room. Many meetings, dinners and smokers were enjoyed there; and the annual meeting was turned into a New Year's party, celebrating the conclusion of a very successful year. The association had at that time 394 members and a cash balance of about $3,000.

From these quarters the association was obliged to retire by reason of a fire that destroyed the building; but on May 1, 1906, the organization decided to take a five-year lease of the five-story brick dwelling, 283 Dartmouth street, in Boston, with the idea of making this the permanent club home. Almost next door to the Hotel Vendome, within a few steps of Commonwealth avenue on one side and Copley square on the other, and with a broad stretch of unbroken asphalt to form the street surface in front, this house was at once recognized as particularly well located; and for two months all sorts of workmen were employed, remodeling and refitting and refurnishing the commodious interior. On July 12 the house was informally dedicated, with speeches by President L. R. Speare, who received the keys from Secretary James Fortescue, and by Vice-President H. W. Whipple, President P. J. Coghlin, of the Worcester Automobile Club, and others. The association entered its new building with a membership of 600.

The association has held a number of race meets and hill climbs, all successful, and last November tried its hand at gymkhana sports.

The officers at present are as follows: President, Lewis R. Speare; vice-president, Harlan W. Whipple; secretary, James Fortescue; treasurer, Harry Knights; directors, Charles E. Fay, Arthur Hinchcliffe, Arthur P. Underhill, John C. Kerrison and George W. McNear. Mr. Speare has been president since the association was first organized, and has proved a popular and efficient officer.

Other organizations which have played their somewhat more utilitarian part in the automobile activities of Massachusetts in the past two years are the Massachusetts State Automobile Association, an A. A. A. organization composed of all the leading clubs; the Automobile Owners' Association, largely for protective purposes; and the Boston Automobile Dealers' Association, which has continued to look after the interests of the trade.

MOTOR BOATING IN NEW ENGLAND WATERS

SCRATCH the skin of a New Englander and you disclose a man who loves the sea. On no section of our country's coastline is there such a marked development of the sailor instinct as is inherently engrafted in the citizen of the New England States, notably those of Massachusetts and Maine. In any foreign port one is sure to find the Yankee salt aboard some vessel in the harbor, and usually in some position of command, a significant truism.

Nature's prodigal hand has lavishly bestowed on New England's picturesque coastline a magnificent series of deep indentations—bays and admirably sheltered harbors, the equal of which would be hard to duplicate in any other 2,000 miles of rocky shore. Every favoring condition has fostered the aquatic temperament and it needed but the advent of the motor boat to crystallize this phase of character into a ruling passion.

From the Connecticut State boundary on Long Island Sound to the farthest coast limit of Maine at Eastport, thousands of motor-driven craft, embodying every type from the humble dory of the industrious fisherman to the palatial cabined yacht of the Boston copper kings. So great has been the demand during the last half dozen years that builders have been driven to their wits' end to fill orders.

The head and center of the market for motor boats in New England is, of course, Boston and its environs, with its unequaled harbor and that splendid expanse of sea water, Massachusetts Bay, whose northerly extremity is Cape Ann, and whose southern end is tipped by Cape Cod. Within this charmed circle is the beautiful harbor of Marblehead, the famous mecca of all motor boatists and yachtsmen in summer. Just now, interest in motor boat circles is centered in the big race for this type of craft, of 270 miles, from New Rochelle, N. Y., to Marblehead, Mass., which will start on July 20, for the Stevens cup. This race is for cruising power boats between 30 and 40 feet over all, and these will be rated on a modified rule, and time allowance will be figured at 60 per cent. of the regular allowances. The boats will be allowed to make one stop for supplies at Cottage City.

In and about Boston, the motor boat has reached its highest development as a commercial conveyance, due largely to the great fishing industries of the coast, of which the Hub is a center. Prior to the advent of the gasoline marine motor, these industrious sea merchants plied their dangerous vocation with sail power. To-day the sail is but an auxiliary, and there is scarcely a vessel in the fishing fleet that is not supplied with a gasoline engine.

New England's inland lakes also offer a fruitful field for the pleasures of motor boating. Thousands of these lakes dot the map, especially in the States of Maine, New Hampshire and Vermont, and all of them teem in summer with power boats, big and little. They are now considered a part of the regular equipment of the summer resident, and the delightful climate is yearly increasing the number of these summer visitors in the inland mountain districts as well as at the shore resorts.

The industry of boat building, always an important one in this part of the Atlantic Coast, has vastly increased under the impetus given by the application of the motor as a power factor, and bids fair to assume proportions that will astonish statisticians within the next ten years.

THE NATIONAL CHAUFFEURS' CLUB.

The National Professional Chauffeurs' Club has its Eastern headquarters at 1947 Broadway, New York City. Its officers are as follows: President, Alden Markham; vice-president, Wm. C. Hurst; treasurer, E. Nassoy; financial secretary, Bertrand Hope; recording secretary, Philip A. Hagel. A recent announcement by the club contains the following:

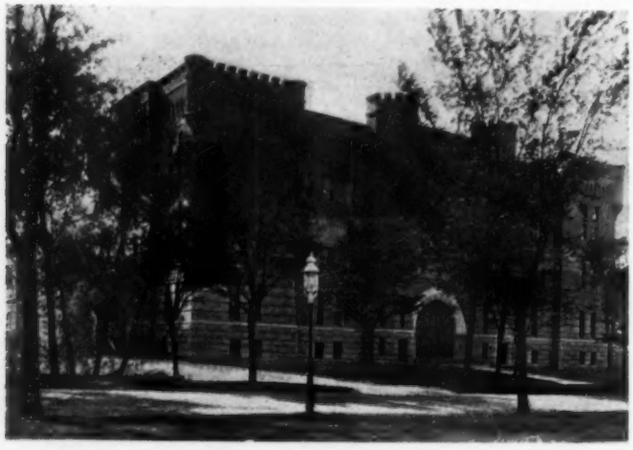
"This club is organized to encourage the education of its members, and to bring to those members that high standard of efficiency that employers will recognize the advantage of employing members of the National Professional Chauffeurs' Club who have passed an examination necessary to obtain a certificate of membership in this club."

"MAXINE," J. H. McCARTHY, BOSTON, OWNER AND CAPTAIN, WINNER OF MOTOR BOAT RACE HALIFAX RIVER, FLORIDA, FEB. 22.

MINNEAPOLIS HAVING ITS BIG SHOW.

MINNEAPOLIS, MINN., March 4.—The first annual Minneapolis automobile show opened Saturday afternoon under the most satisfactory conditions. The new National Guard Armory is crowded with cars and the balcony spaces are packed to their utmost with accessory exhibits and special exhibits of various kinds. The show is drawing crowds from all parts of the Northwest, as it is the first exhibition of the kind given west of Chicago.

The formal opening occurred at 8 o'clock, when Governor Johnson and Mayor Haynes of Minneapolis delivered short addresses. Nearly 100 cars are in place on the floor of the Armory. The big drill hall is magnificently decorated, the general effect being the most satisfactory that has characterized any show ever given in the Middle West. The costly decorations of the Chicago show were transported to Minneapolis almost in their entirety and are displayed to better advantage in the Minneapolis Armory than they were in the Chicago Coliseum. The general scheme of the decorations is in purple and gold. A sky of bunting overhangs the entire hall, and thousands of lights make the scene a most brilliant one at night. The heavy plaster friezes, pillars and other parts of the decorations brought from Chicago have been used with wonderfully good effect.



NATIONAL GUARD ARMORY WHICH HOUSES THE SHOW.

All of the exhibitors of cars are retailers, with the exception of the H. E. Wilcox Motor Car Company of Minneapolis, which shows for the first time the Wolfe car, built by the company.

There are a number of novelties displayed. Electric power has been used to drive the exhibition chassis and stripped models of the demonstration cars on the floor of the Armory The exhibitors are as follows:

Main Floor.—Pence Automobile Co., Jordan Auto Co., Northwestern Cadillac Co., Haynes Automobile Co., Fawkes Auto Co., Northwestern Automobile Co., F. G. Winston, Jr., Columbus Buggy Co., G. W. Caplin, Walter G. Benz, A. C. Bennett, Evans Motor Car Co., Aerocar Co., Barclay Automobile Co., H. E. Wilcox Motor Car Co., W. C. Thornhill, Wallis Coach & Carriage Co., East Side Auto Co., Maxfield & Rice Bros., A. F. Chase & Co., Auto Selling & Repair Company.

Balcony Exhibitors.—C. J. Smith, St. Paul; Invincible Tire & Armor Co., Hartly, Iowa; Lougdin & Brugger, Fon du Lac, Wis.; V. Houbert, St. Louis; Bailey Leather Tire Co., Milwaukee; Tokheim Mfg. Co., Cedar Rapids, Iowa; Gugler Electric Co., O. Fenstermacher & Co., Hollis Electric Co., Frederick Roach, Penn Oil & Supply Co., J. N. Johnson Co., Beckley Ralston, Shadegg Engine Co., Minneapolis Electric Motor Co., Sorg-Bader Co., E. J. Hodgson, Fawkes Automobile Co., Index Speedometer, Evans Motor Car Co., Western Auto Co., General Electric Co., Twin City Motor Co.

GITHENS WILL NOT LEAVE THE G & J TIRE CO.

DETROIT, MICH., March 4.—H. A. Githens, long identified with the G & J Tire Company, positively denies the report that he intends resigning his present position to become identified with the Empire Automobile Tire Company

CHICAGO TRADE ELECTS GUNTHER.

CHICAGO, March 4.—At the annual meeting of the Chicago Automobile Trade Association Joseph F. Gunther, manager of the Chicago branch of Thomas B. Jeffery & Company, was unanimously elected president. It was expected that there would be an opposition ticket in the field, but the movement collapsed owing to the refusal of Orlando F. Weber, agent for the Pope cars, to head it. Thomas Hay, manager of the Chicago branch of the Ford Motor Company, had been nominated as secretary, but declined owing to press of other matters, and Fred Dayton, manager of the local branch of the Electric Vehicle Company, accepted the office. Henry Paulman, Chicago agent for the Pierce, was elected vice-president, and Walter Githens, who held the latter office during the past year, was selected for the post of treasurer, the election of all the officers being by acclamation. Ralph Temple, the retiring president, was elected a director, with Orlando F. Weber and F. W. Cornish as his associates on the board. Mr. Gunther, who officiated as treasurer last year, was one of the original founders of the organization. The matter of contests was the only other business considered, and it is proposed to repeat all those held last year.

A resolution was adopted requesting the A. A. A. Touring Board to end the tour in Chicago.

A petition was also prepared and presented to S. A. Miles, urging that an earlier date be named for the holding of the Chicago show.

PORTLAND, ME., HAS SUCCESSFUL SHOW.

PORTLAND, ME., March 2.—With band playing, thousands of electric lights blazing, and a big throng leaving the building, the second annual automobile and power boat show in Portland came to a triumphant conclusion this evening. For one solid week the exhibition had held sway in Portland's biggest show building and during that time, forenoon, afternoon and evening, crowds had filled the building. One year ago Frederick M. Prescott of Boston gave the first Portland show. While it was in a measure successful, the financial end did not come up to expectations. Mr. Prescott was not disheartened, however, and immediately reengaged the Auditorium for 1907, and has now secured it for 1908. Mr. Prescott announced at the end of last week's show the complete success of the venture from every standpoint.

Although the streets of Portland were piled high with snow during the show week, this did not deter the various exhibitors from demonstrating their cars, and many a machine received a very trying try-out. The weather itself was favorable for the exhibition and hundreds of people came from all over the State to attend the show.

RAMBLER'S NON-STOP RUN OVER 2,000 MILES.

MILWAUKEE, March 1.—After running 2,002 miles in 140 hours and 36 minutes, Van Evra B. Martin's three-year-old Rambler brought its non-stop run to an end in this city through the clogging of a gasoline pipe. The run was started upon by the owner of the car, an enthusiastic autoist who had taken exception to an article in a Milwaukee paper saying that stock cars were not equal to the non-stop runs performed by various manufacturers. Van Evra B. Martin's intention was to run one thousand miles without stopping the motor, but he more than doubled this distance and might have gone still further if the run had been confined to Milwaukee boulevards. The run was started with no other preparation than new tires and batteries. Mr. Martin drove the machine himself for most of the distance.

PREMIER TO BUILD A WATER-COOLED "SIX."

INDIANAPOLIS, IND., March 4.—The Premier Motor Manufacturing Company will bring out a six-cylinder water-cooled car next season. Factory experts are now at work on the design, and a trial car will be ready, it is expected, within a few months. It is understood that the Nordyke & Marmon Company will bring out a six-cylinder air-cooled car next season..

KELSEY'S TAXIMETER CAB PLANS.

C. W. Kelsey, who has now definitely announced the organization of a large company for the building and operating of taximeter cabs and delivery wagons in the larger Eastern cities, of which he is to be general manager, is now in New York City completing the details of the organization. Mr. Kelsey said recently in discussing the cab situation:

"We shall be ready in a very few weeks to announce to the public the details of the methods by means of which we shall be able to give to New York, Philadelphia, and Boston (and later to other cities) the most complete and reasonable-priced cab service they have ever had. The cabs will be put in service as fast as they can be built, the style of design and construction having been already decided upon. The cabs will be driven by chauffeurs who will handle them upon a percentage, and the method in use abroad of using an indicator showing that they are available for hiring, will be installed in this country. A flag, which will be tipped down when the cab is in use, will be displayed as soon as the call is at an end and the cabs will be ready for service whenever and wherever they are seen with the flag flying. The mechanical device known in Europe as a taximeter will show the occupant just how far he has traveled and what he will have to pay for the service. The prices will be far lower than those now in vogue, even for horse-drawn cabs, and, of course, the service will be far more satisfactory.

"In addition, the company will build delivery wagons and trucks which will be leased to merchants and business houses of all descriptions by the year, and will be kept in repair by the owning company. This will take from the merchant the bother of establishing garages and repair shops, and as the drivers are to be furnished with the wagons, there will not be the trouble heretofore encountered in securing reliable help. To provide for this business, the new company will establish large shops in the cities mentioned, and extensive schools similar to those run by the street car companies for the training of drivers. There will be also a system of inspection and repairs, by which every vehicle will be thoroughly overhauled at short intervals."

PHILADELPHIA'S PUBLIC AUTO LINES.

PHILADELPHIA, March 4.—On Thursday last the Highway Committee of City Councils negatively recommended the ordinance introduced in the interest of the People's Vehicle Company, asking for a 25-year franchise to operate automobile omnibuses over many of the principal streets in the city, the knock-out being based upon City Solicitor Kinsey's opinion that councils could not constitutionally sign away the sole right to the use of the city's streets for such a purpose. Such a right, he intimated, lay only with the State Legislature.

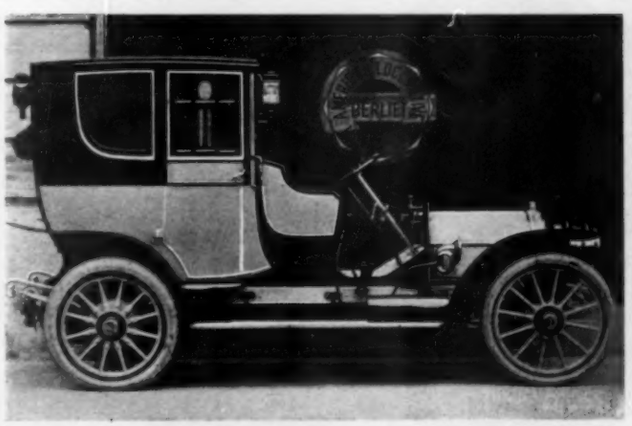
At the same time the committee favorably recommended the Abrams bill, introduced last December, and giving any transportation company the right to use any or all the streets of the city for operating public autobus lines, and providing for the payment of licenses for such vehicles graded according to the number of passengers carried (up to 30), setting forth the minimum width of tire allowable for vehicles of various weights up to 20,000 pounds. This ordinance had been introduced in the interest of the Auto Transit Company, of Philadelphia, which claims to be able to put a score of buses on Broad and Diamond streets within a month or six weeks after Councils finally pass the measure and the Mayor's signature makes it a law.

The vehicles which the Auto Transit people propose to put on the initial route from City Hall to Fairmount Park via Diamond street, are of the Imperial type, built by the Commercial Truck Company of America, and will be of the four-motor, four-wheel drive design. Although no definite announcement has as yet been made as to the rate of fare to be charged, it is asserted that the Auto Transit Company believes that it can make a profit on the "five-cent, no-seat-no-fare" basis. With a maximum seating capacity of 30, this would seem to be a doubtful proposition.

AN ORIGINAL AUTOMOBILE BODY.

It is a curious fact that after hundreds of years of development the seating accommodation of a horse-drawn vehicle should show practically no progress. The royal coaches of Louis XIV., for instance, are equal in comfort, for a given area, to anything our modern carriage builder produces. When the first automobiles came the driver and his guests sat on a plain wooden seat in a box-like body. Ten years brought greater changes than ten centuries had been able to produce under the horse period, and the automobile body of to-day is the most commodious, comfortable and luxuriously-fitted of any road vehicle that has ever been brought forth.

The countries of the old world have paid most attention to the luxurious type of closed automobile, but that America can produce work equal to the best of the most famous French carrossier is proved by the handsome body built by C. P. Kimball & Co., of Chicago, now on view at the American Locomotive Company showrooms on Broadway and illustrated herewith. The coachwork is mounted on a 22-horsepower Berliet chassis, and forms a happy combination of the best French mechanical skill and the highest American art in bodymaking. The feature of the vehicle is that it is a modernized type of an old English coach, and has all the charm of that old-time vehicle without any of its



OLD ENGLISH COACH BODY, DESIGNED BY KIMBALL.

inconveniences. The body is painted a pale yellow with black lining and black underbody. At the rear is a projection forming a pocket in which swords and pistols were carried in the good old days. Two rear lamps outside and close to the roof add further to the old-time appearance of the vehicle. The side windows are provided with wooden panels sliding into pockets—another old-time idea. All the exterior fittings of the car have a gunmetal finish; the door handle and grip is handsomely carved and really a fine piece of work. Gray broadcloth is the material used for interior upholstery, but is only applied to the seats, floor and lower part of the body, the roof and upper portion of the sides being in polished mahogany. There is one rear seat with seating room for three and two folding seats facing towards the rear. The two outside rear lamps light the interior, but additional illumination is supplied by a couple of electric lamps. A speaking tube communicates with the driver and numerous pockets are supplied for maps, books, etc. Head and side lamps are acetylene, the rear lamps burning kerosene. Wheelbase is 112 inches, track, 55 inches.

UNABLE TO SECURE SKILLED WORKMMEN.

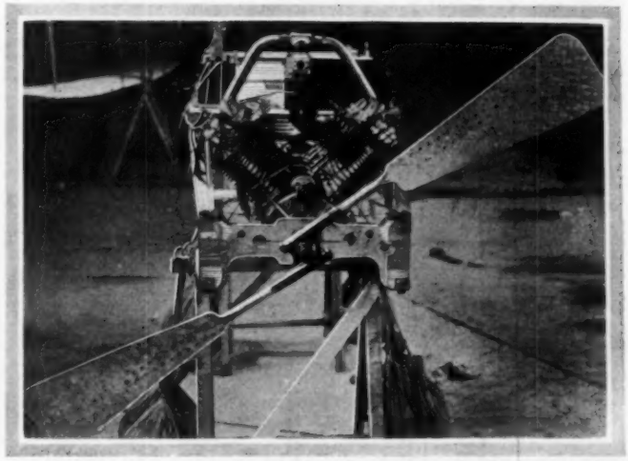
OMAHA, Neb., March 4.—Scarcity of skilled labor has compelled the Karbach Automobile & Vehicle Company to discontinue the manufacture of motor trucks for a year. Advertisements for skilled automobile workers, placed in Eastern papers, failed of successful responses.

AN AEROPLANE BY NOTED INVENTOR.

PARIS, March 1.—An important flying machine of the heavier than air type is expected to make its first appearance before the public in a few days. The aeroplane, which is under construction at the Voisin Frères factory at Billancourt, near Paris, is in general appearance similar to the latest Santos Dumont models. It consists of a cellular frame, presenting an area of about 45 square meters, and weighs altogether 400 pounds. The motor is an eight-cylinder, 24-horsepower air-cooled Buchet, with cylinders forming V, carried at the forward end of a wooden frame very similar to the frame of an automobile, and driving a two-bladed fan. The aeroplane is the property of M. Kapferer, a well-known Paris engineer, who was the first to place on the market the dismountable rims which played such an important part in the Grand Prix and other European races last year.

M. VOISIN.
Head of the well-known French aeroplane works.

Santos Dumont has removed. On the polo ground at Bagatelle, in the Bois de Boulogne, he was cramped for room and was, in addition, always afraid of coming down on the heads of the numerous sightseers who gathered to watch his attempts at flying. He therefore this week took up his quarters at Saint-Cyr, to the west of Versailles, where a big shed has been built for him on a large open plain used by the cadets of the military school. The shed is a commodious structure, with big glass windows, allowing the aeroplane to be taken in and out without any difficulty. No. 14bis, the first machine heavier than the air with which the young Brazilian accomplished a successful flight, is being replaced by a larger model, measuring 40 feet from tip to tip, but only 2 feet in width. The framework is of mahogany, covered with varnished cotton. Between the two wings will be installed a 50-horsepower Antoinette motor of very light weight, specially designed for flying machines. Later this will be replaced by a 100-horsepower motor of the same make. The pilot will be placed above the motor, with the controlling levers in front and the rudder and propeller astern. Santos Dumont has obtained such a satisfactory equilibrium that he has decided to run his flyer over the ground on one wheel only. All previous machines have been started on two wheels. It is expected that the machine will be sufficiently advanced to compete for one of the most important prizes of the Aero Club of France before the winter is over.



EIGHT-CYLINDER BUCHET MOTOR FOR KAPFERER AEROPLANE.

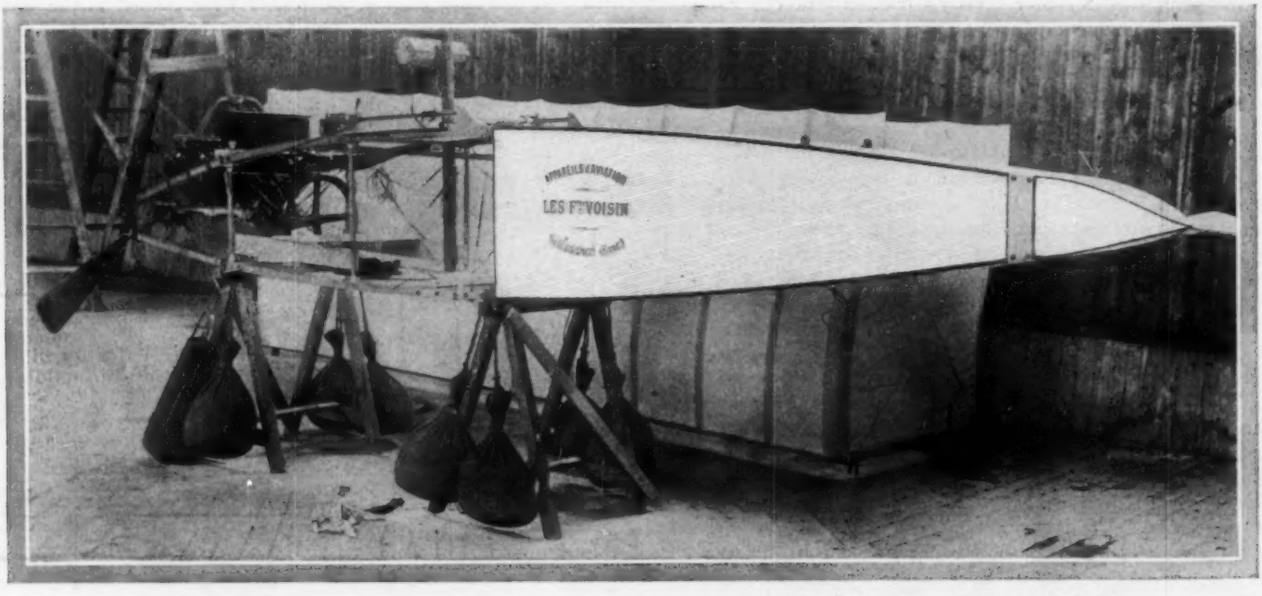
SUCCESSFUL AEROPLANE FLIGHT IN PARIS.

A cable from Paris to the *Herald* announces that M. Vuia has succeeded in flying in a distance of about fifteen yards at a height of four feet and at a speed of about thirty miles an hour. The experiments were made on the Bagatelle polo ground, close to the Bois de Boulogne, Paris, where most of Santos Dumont's flights were made. The Vuia aeroplane has not been so successful as the young Brazilian's machines, but her owner is hopeful of better performances when minor improvements are made.

OLDS "MUDLARK" TO HAVE A HOME COMING.

AKRON, March 4.—The *Mudlark*, the Oldsmobile in which Andrew Auble and Fred. W. Work, of Akron, and R. R. Owen, of Cleveland, rode through sand and mud and water from New York to Florida, has been in this city all this week. It is still equipped with the accoutrements that were used to pull the machine through mud and sand in the Southern States. The machine still carries two of the original Goodrich tires that were on it when it left New York.

Messrs. Auble and Work brought the machine from Cleveland to Akron under adverse conditions in 1 hour 40 minutes. The distance is thirty-five miles. The machine will be driven to Lansing, Mich., where it first saw shape.



M. KAPFERER'S NEW AEROPLANE UNDER CONSTRUCTION IN THE VOISIN FRERES FACTORY NEAR PARIS.

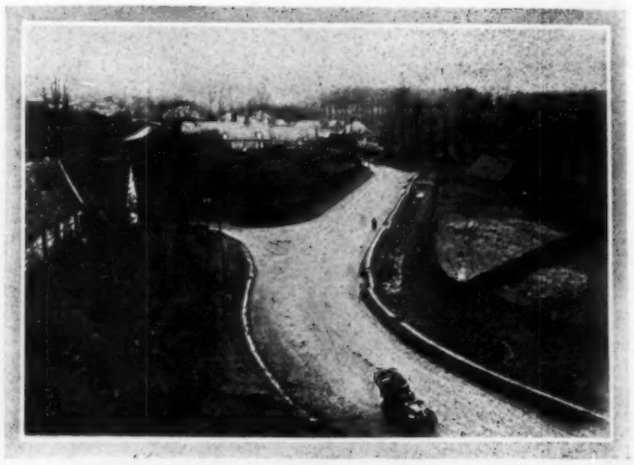
A RUN ROUND THE GRAND PRIX COURSE

PARIS, Feb. 26.—A temporary spell of fine weather had improved the roads somewhat, though the routes in the immediate neighborhood of Paris were far from being inviting, when an invitation came along for a run round the Dieppe circuit. Out through the Porte Maillot, a few miles' bumping over rough *pavé*, and the typical national highways were struck and allowed of good running for the time of the year. The circuit was entered at Londinières, the point nearest to Paris, and a run made up the easterly leg to Eu. These are not the routes nationales, or first-class roads of France, supported by the government, but departmental roads, maintained by the department. Nevertheless they are excellent routes, and permit of the fastest going. Despite the wintry season the country has a certain charm, with its old orchards, stocked with spreading apple trees which in less than three months will be a picturesque mass of white and colored blossom, its healthy-looking cattle and pleasant meadows. There are a few sharp grades, turns that call for a little skill at high speed, but which are in no way dangerous, and some long straight stretches, with the ribbon of hard gray road stretching out for a couple of miles ahead, tempting the driver to let his four-year-old Renault out to its utmost power until pulled up by the exasperating photographer in the rear of the tonneau with the remark, "I must have a snap at that."

A curious sight was supplied by the primitive little carts pulled by a team of dogs. The auto was stopped as we approached one of these equipages, and the fair Normande sitting in the vehicle asked to pose, which she did without any demur, and with as much natural grace as a Parisian. The dog carts are quite a feature of this part of France, and several were passed while running round the course. One carried a patriarchal individual whose body appeared to have developed in undue proportion to his legs; another carried a couple of milk cans, and was accompanied by a sturdy youngster who ran along by the side of his team, stopping an instant to give a passing cheer to the auto. There is rather a sharp turn under the Dieppe railroad near Eu, and a little further the village itself is struck and the coast leg of the circuit started on. Although the turn is in the heart of the village there is so much space that the racers will not be at all hampered. Eu to Dieppe is a splendid run, winding and hilly at first, later straight and wide, with a view of the English Channel from time to time on the right. But for the photographer in the rear we might have imagined we were practicing for the race. These roads are never muddy, thanks to their hard surface and the fresh breezes always blowing in from the sea. Dieppe is not touched, the sharp fork-like turn being nearly two miles from the herring town. The turn resembles that of La Fourche on last year's Sarthe circuit, but is much more easily negotiated. Down the third leg of the course from Dieppe to Londinières we fall in with the local railway, which claims a share of the highway. It is not an important affair; the express makes a poor speed showing compared with even our ancient model, all service will be stopped on the day of the race, for the Grand Prix is a fête day, but it is none the less an inconvenient neighbor. For some distance it narrows the road considerably with its high bank. To get more width some of the trees on the inner side will have to be cut down. What is the cost of a few trees? Has not the district offered one hundred thousand francs to the Automobile Club of France? One hundred thousand francs, it is the subject of conversation in every café, and there is not a laborer in the country who has not calculated how long it would

A FINE STRETCH OF NORMAN ROAD ON WHICH THE FORTY-THREE WILL SHOW LIGHTNING SPEED.

A FEMALE PEDLER AND HER FIVE-DOG TEAM.



RUNNING INTO THE PEACEFUL VILLAGE OF EU.

take him to earn that amount at three francs a day. Envermeu is one of the more important villages on the course, which can be passed through without any difficulty, despite its scattered elongated formation. Its center of attraction now is a village shop, where wax candles, groceries and gasoline can be bought "half wholesale" or retail, a village inn, and an ancient church. The last named will be indifferent to the auto race, but the two former have an eye open to business and a high ideal of the glorious days which are coming. There are no signs of work on the course yet, but plenty of preparations. The landlord of any of the inns on the forty-seven miles of circuit will tell you all about it, and give the names of every member of the racing board, the list of competitors, their past performances and their full pedigree if you desire it.

IMPORTANT GRAND PRIX PREPARATIONS

PARIS, Feb. 24.—One of the most difficult points to be regulated in connection with the Grand Prix, is the placing of the replenishing stations. Supposing no further entries are received, there will be forty-three competitors, thirty-four of which must be supplied with gasoline at the rate of 6.6 gallons per 62.1 miles, and nine with half this amount. Last year a station was given for each firm, the cars stopping before their familiar sign to take in gasoline, change tires or affect repairs. As the racers will have to take their gasoline in two, or perhaps three doses, it being impossible to carry the full amount from the start, it has been suggested to give a separate station for each machine. Different firms will have from one to five cars in the race, and it is quite possible in the excitement attending the arrival of a machine to hand over the gasoline tank for number 10 to number 20, and probably put the whole race in danger. All machines are being built to work as near to their fuel limit as possible, and none of them could afford to get the tank of a rival with even a slightly less quantity to his credit. Nor must the unclaimed fuel supply of a broken-down racer be available for surreptitiously feeding its more fortunate companions. The regulations stipulate that the reservoir of each machine shall be filled at the commencement of the race, and the surplus gasoline placed in a sealed vessel and placed at the driver's disposition. Forty-two stations would make an exceedingly long line, and place some of the machines out of the range of vision of the grand stand, a serious defect, for the work at the stations forms one of the most interesting parts of the race. For this reason many of the members of the racing board are in favor of one station per firm, with distinctly marked gasoline cans for each machine, and a very severe control to prevent the possibility of fraud.

THE LOCAL RAILROAD CONSIDERABLY NARROWS THE ROAD.

ENVERMEU IS A TYPICAL NORMAN VILLAGE.

TIME FOR AUTOISTS TO WORK OPENLY FOR ROADS

By JAMES W. ABBOTT, Ex U. S. Commissioner Office Public Road Inquiries.

LOS ANGELES, Cal., March 1.—The work for good roads which has been done of recent years in California has lately reached the stage of an impatiently insistent demand that relief be afforded "right away off." A very prominent man of affairs in Los Angeles said to me the other day: "I haven't had my automobile out of the barn in two months; the roads are impassable and I couldn't get anywhere with it." Recently I had occasion to go from Los Angeles on the electric car to Pasadena. As we sailed along thirty miles an hour we came upon a very suggestive spectacle: sunk in a sea of mud was a fine automobile. Attached to its front axle was a long block and tackle contrivance which led to a distant snubbing post. Stretched along either shore of this bayou were enough people for a good-sized village, and a system of foot tracks in the mud was calculated to inspire belief that a futile effort had been made by these sympathetic human beings to extricate the vehicle.

A FRENCH ROAD IN EARLY SPRING—NOTE ITS EXCELLENT CONDITION—MATERIAL FOR REPAIRING IS PLENTIFUL.

And all this was on the main highway connecting the two most beautiful cities of California, whose centers are scarcely a dozen miles apart. The millionaires of these two cities might build an Appian Way along this road and never realize that they were out a cent. The owners of property along the road might contribute the funds to make it a perfect highway and find their assets actually increased in spite of the outlay.

It is just a phase in the period of evolution towards full civilization in America. It is comforting to realize that others who have made greater progress had to pass through just this stage.

But to the readers of The Automobile there are other still more inspiring reflections. It is just because these automobiles stick, and throw mud, and bring to those who attempt to ride in them unspeakable grief that this present frenzy for something better has come about. It is on and will stay on till the automobiles get emancipated. I have seen it coming and done what I could in a humble way, here and there, to inflame it.

Studied Good Roads Movement for Seven Years.

Having studied the good roads movement intimately the past seven years all over the United States, I have had exceptional opportunities to watch its growth and its changing phases. I was present in Portland, Ore., at the convention in June, 1905, when the moribund National Good Roads Association became practically extinct. June 30 of the same year the "Office of Public Road Inquiries" expired by operation of law and its methods of educating public sentiment came to an abrupt termination. When the old "Division of Tests," renamed the "Office of Public Roads," began to operate along the lines now followed it became evident that the generation on the stage of action to-day would be walking the streets of the New Jerusalem long before any great advance in the cause would be made from that influence. I was present at many conferences in different and widely separated cities, where men who had been actively engaged in the work discussed plans for forming an association to take up the work and conduct a campaign for good roads on a general method akin to that followed in a national political campaign.

It seemed to be a logical scheme of organization to unite in the executive board of such national organization all interests, which would be pecuniarily benefited by road betterment. On such board the automobile, carriage, farm vehicle, street paving, brick making, and very many other industries would have representation. So far as I know this idea was never carried out.

Time for Autoists to Make Road Question Their Own.

Meanwhile industrial history has been making rapidly. If I read aright the signs of the times, the hour has come for the automobile interests to take up the road question as *their question*, and to deal with it as a *sine qua non for them* and one which for that reason they are going to take sole charge of and solve. The time has passed when all mankind was divided into two parts: one, an insignificant minority, using the death-dealing go-devil as a luxury, with reckless disregard of their own or their neighbor's anatomy; the other, the balance of the human race, whose sole interest in these infernal machines arose through a common instinct for self protection. In less than half a score of years they have jumped from a position of tentative experiment to a place beside the steam engine as an indispensable requisite in the world's progress.

When the automobile captured the farmer it had conquered the world. The hayseed of other days may once have been correctly depicted in overalls and whiskers upon the board seat

of a rickety wagon, holding the lines over a pair of venerable plugs. The passing of this type is, in my mind, the most important fact of the Twentieth Century to date. The farmer of to-day is the nabob. His mortgage has been paid off, he has money in the bank, travels for pleasure, and rides in an automobile. Not all of him, but enough to indicate with certainty the economic changes which are imminent. From this time on his interests square absolutely with those of the rapidly augmenting element to which the motor car has become an indispensable necessity. In the conquest, which is just ahead, for the commercial vehicle, the farmer will be strictly in it. The truck car will haul his products to rail or water; with motor devices he will plow, plant, sow, and till his fields and gather his harvests. It is easy to see what the commercial vehicle will do in every line of work.

Automobile Needs and Should Get Roads.

Having now reached the period when the motor car industry affects every possible department of human activity, what could be more logical than for that interest, as such, to take up the road question and proceed to solve it? No one can say longer that the automobile interest should hold itself in the background lest it arouse antagonism. The automobile interest has become IT in the world. The Automobile needs good roads. It should combine its forces and get the roads.

Just how that should be undertaken, I am not prepared yet to say. I think the first thing is for those interests to announce boldly that the time for hesitancy has passed, the time for action come, and that the automobile people—makers and users—are going to see that the necessary legislation is enacted, the necessary money raised, and the roads built.

I have always felt myself that a central organization should have general charge. Hasn't the time come to take up the subject in the executive bodies of your great organizations, and to consider it as a need which you will have satisfied?

And now, reverting again very briefly to the condition which furnished my text: "The needs of California and the movement now started for relief."

By reason of its topography and climate, California has an opportunity to furnish a more striking object lesson of American possibilities than any other section of this continent. The world would be searched in vain for such a pleasure ground twelve months in the year as California would become with a complete system of good roads. So great would be the attraction that even kings would leave their thrones and hasten to try the delights of automobiling among the orange groves and gardens, the fields and the missions, the seashore and the mountains, the luxurious cities and the beautiful towns. No man who loved the exhilaration of the swiftly gliding car would be content until he had come to this enchanted land and seen for himself, and when he went back home he would carry with him the story of what could be done to make this earth a paradise.

A preliminary convention was held last week to devise ways and means to make a start. The laws of California are very backward in their provision for roads. A bill framed on the lines of the New York State aid law will be drafted and an earnest effort made to get it enacted. The legislature is in session. What is done must be done quickly. I have no special interest in California, but I have given the best of my life to this cause, and I want to see it win. Because I so feel I beg you and all my friends who will read this to do what you can to so shape sentiment in this State and to so enlighten this people as to their true interests that such law may be passed.

CONNECTICUT ROAD COMMISSIONER'S PERTINENT REPORT

NEW LONDON, Conn., March 4.—In the abstract of the two years' report of State Highway Commissioner James H. MacDonald, presented to the governor, the question: "What injurious effects, if any, do automobiles have on our road system?" is discussed affirmatively as follows:

At home and abroad this question has been asked any number of times, and I have thought it of sufficient importance to reply to it in my report. It is astonishing how popular motoring has become in our State, and, in fact, all over the United States. Since the issuance by this State of the first license on May 28, 1903, up to the present time, 4,000 licenses have been issued by the Secretary of State. About 400 of these licenses are for motor cycles and about 300 licenses have been issued to transients. No license fee is charged non-residents unless they are to remain in the State for a period exceeding fifteen days. The sum of $2 is charged for a license. This fee, it is apparent, is only nominal, and the income derived from this source does not amount to a very large sum in the aggregate. The use of the automobile, it must be conceded, will grow rapidly, and, as automobiles have come to stay, the use of the roads by this class of vehicles will form a very large part of the traffic over the highways of the State. If it be true that so many citizens own automobiles and use the roads for business or pleasure, it is equally true that the number of persons using the roads is augmented several thousand by those who come into our State, this latter class contributing nothing to either town, city, county, or State treasury.

Now, the vital question is: Does the automobile injure our roads more than the travel of other vehicles? If so, in what way? It is only fair to take this question up broadly so as to reach a fair conclusion in determining this factor in the solution of this newer problem confronting us in the use of the highways. I have made a close study of this question during the past two years, and I am satisfied that no agency at work on the roads has directed attention to the use of our roads to the extent that the automobiles have. The natural inquiry will be, in what manner has this been done?

It is safe to say, in reply to this inquiry, that our roads have shown more wear on the surface during the past two years than for any similar period since the commencement of macadam construction in this State. In nine out of ten towns artificial moistening of roads is not resorted to by the officials in towns where our macadam roads have been constructed. The use of the sprinkling cart seems to be a lost art, and the only moisture the macadam receives is from the rain and the dew, except, of course, in winter time, when there are occasional snow storms. For that reason our macadam roads are very dry in summer and become an easy prey to rapidly moving automobiles. The low-hanging machinery of the car restricts the space from the top of the road to a narrow opening which the rapidly moving car transforms into a draft, the suction from which removes all loose or insecure particles from the surface of the road, very much as a carpet sweeper operates.

The screenings top has two useful purposes. One is to form a cushion to protect the second course of stone, which is the top course of stone immediately under the screenings or finishing surface of the road. This cushion protects the underlying stone from direct contact with the shoe of the horse and the tire of the wagon. Its second office is to retain moisture in the summer time, thus preserving the cementic properties of the screenings, and in the winter time furnishing a covering that prevents the entrance of frost into the road, and also removing the possibility of disintegration and heaving of the road screenings. It also operates to prevent the fall rains from penetrating into the courses of stone, thus inviting frost, and leaving the road, when the frost departs, green and very susceptible and responsive to travel.

In the summer time, particularly, when our roads are very popular and are used largely by all kinds of vehicles either for business or pleasure, the passing of one of these rapidly moving cars removes from the road its intended protection. Horse-drawn vehicles that follow are, by this stripping process, brought into direct contact with the stones that have been uncovered by the automobile. These stones are early dislodged from where they were imbedded, and a fracture is made in the road. The stones thus loosened act as an irritant to the other stones when struck by hoof or wheel, the bond is thus broken and the road immediately demands repair, or a large bill of expense will result. If the road is not at once taken care of the influence of even a slight fracture is far reaching. This destructive force has been at work for some time, but its effects have been more noticeable during the past year than ever before.

This description of how roads are injured is apparent, not only to the men who make a business of the art of road building, but is the subject of grave consideration in towns where a macadam system has been laid. All over the State where we have a macadam system officials are inquiring how to remedy the evil.

ACCUMULATORS FOR ELECTRIC IGNITION

By CHARLES B. HAYWARD.

AS already outlined in a previous part of this article, the process of accumulator charging and discharging is not a mysterious form of storage for the electric current as popularly supposed, but is purely one of chemical conversion and reconversion. But it is not necessary that the autoist should be an electro-chemist in order to be able to understand or properly take care of a set of accumulators, and it is accordingly not intended to go deeply into that side of the subject here. Nor will the matter of history be gone into further than to state that the discovery that a current sent through a voltaic couple consisting of lead plates immersed in dilute sulphuric acid, set up a chemical action which could be reversed and a current drawn from the cell, marked the inception of the accumulator or storage battery. That was more than half a century ago and though numerous combinations of other materials have been tried in the interim, none proved practical in a commercial sense until the discovery of the nickel-iron combination in an alkaline solution by Edison. As all the accumulators now on the market for ignition purposes are of the older type, it will be unnecessary to consider any other than this, though it may be added that the characteristics of any accumulator are bound to be very similar regardless of the materials used in its construction. Any form of cell which is reversible—that is, from which a current may be redrawn, after charging it—is, properly speaking, an accumulator, some primary forms having this characteristic, but only in a very slight degree and not sufficient to render them of any value whatever for this purpose.

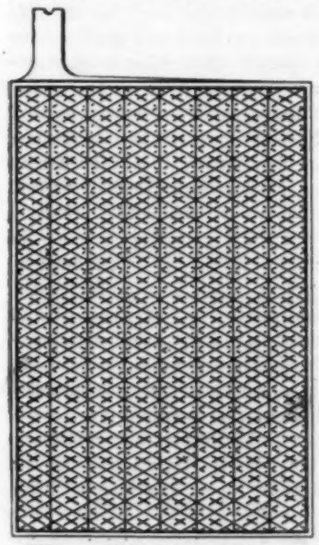


FIG. 1.—Helios Cast Grid before pasting with the active material.

How Accumulators Are Made.

In order that the autoist may not only have a thorough understanding of the subject, but also be able to understand why it is important that an accumulator should be cared for in a certain way and certain things avoided, it is essential to have a knowledge of how an accumulator is put together. In this connection, he should bear in mind those elementary principles that were outlined in the first part of this article as they are directly involved. So far as its essentials are concerned, the statement that an accumulator consists of two lead plates immersed in dilute sulphuric acid, suffices to define it, but it is evident that two sheets of lead dipping into a jar of electrolyte could not very well be carried on the car, so it will be evident that the remaining considerations are purely mechanical. Mention was made of the fact in a previous part of this article that originally accumulators were made by what is termed a forming process. That is, metallic lead plates with smooth surfaces were placed in the electrolyte and "formed" by passing a current through them; in other words, by electro-chemical means. This is known as the Planté type of plate. It has been almost totally superseded by what is known as the "pasted plate," or Faure type. In this, the foundation consists of a grid consisting of pockets or recesses into which the active material is pasted by hand and solidified under pressure. Each method has its advantages, depending upon the service for which it is intended, and it will be found that both are used for automobile work, though the pasted type practically monopolizes the field, the "Invincible" being the only formed type for ignition use.

Numerous Processes and Types of Grids.

There is absolutely no end to the number of methods of forming or to the types of grids at present on the market, many of the processes being well-guarded trade secrets. It would be of no advantage to attempt to review even the best known types, so that this matter is gone into only to an extent sufficient to illustrate the fundamental principles and methods of construction embodied in every standard accumulator. It was not long after the original discovery of the principle of the accumulator that it was found possible to greatly increase the activity of a simple cell by surrounding the positive plate by the negative; that is, in order that both sides of the positive plate might be active. This accounts for the use of one more negative plate in every accumulator, as in this way both sides of all the positive plates are utilized and the capacity of the battery greatly increased. When the charging current is sent through a cell, the active material, peroxide of lead in the case of the positive and metallic lead in a spongy form on the negative, expands and the electrolyte also changes its density. On discharge, the converse takes place and this expansion and contraction take place to a marked degree, proportionate to the size of the plates. For this reason every cell has a safe charging rate and a safe discharging rate, and greatly exceeding it, particularly in the case of the discharge, causes the plates to warp or "buckle," as it is usually termed, either forcing the active material out of the retainers or bending the plates so much that they come in contact with one another.

The capacity of a battery not only depends upon the square surface presented to the action of the electrolyte, but also to the porosity of the active material and its conductivity. The maker is thus confronted with the problem of making the active material loose and porous and at the same time hard and resisting in order to stand the shocks of usage, without falling out of the plate. The illustrations of the few types of grids shown will suffice to give an idea of the method of retaining the active material. The first, Fig. 1, is the grid of a Helios cell, while the second, Fig. 2, is that of a Toledo cell, made from chemically pure sheet lead, the completed plate being so flexible that it may be rolled upon itself; many makers employ a composition of antimony and lead in order to secure stiffness, the grids being cast, while others are made directly from sheet lead under heavy pressure. Those referred to are the pasted type. One of the few cells that is made in small sizes by the forming process is the Type H "Invincible" cell, the construction being such that the active material is retained by gravity. This type is intended particularly for automobile and marine ignition work, though the method of making renders them more expensive. It will be obvious that in any portable type of cell, such as that required for electric vehicle and ignition work, the chief requisite will be large capacity without undue bulk, and to obtain this the plates are placed as close together as possible. In order to insulate them thoroughly and still permit of the active circulation of the electrolyte upon which the working of the cell depends, grooved wood separators and

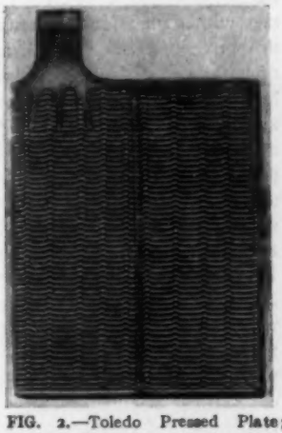


FIG. 2.—Toledo Pressed Plate; made from chemically pure sheet lead.

perforated hard rubber insulators are employed, a typical group of these parts being shown by the illustration of the Autex plates and separators, Fig. 5, and also by the dismounted unit of the Look cell, Fig. 6. In some small cells, such as for ignition, it is possible to place the plates sufficiently far apart to dispense with separators of any kind as is done in the case of the "Reliance" cell—about

FIG. 3.—Cross section of plate for forming

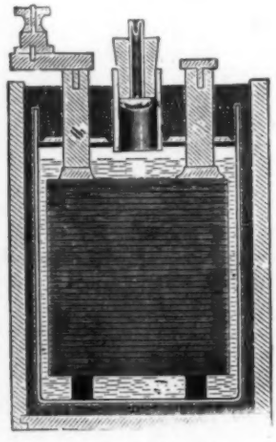


FIG. 4.—Section of American Cell showing components.

the only one made in this country that employs a celluloid containing case.

General Requirements.

An idea of the requirements of the completed cell, other than those already mentioned may be gained from the illustration of the section of an American cell, Fig. 4. This is an end view of the cell and shows that the group of plates is not permitted to rest upon the bottom of the containing case but is elevated therefrom. The supports shown are square strips of hard rubber and the necessity for so placing the plates arises from the fact that the active material is constantly disintegrating to a greater or less extent and falling to the bottom of the jars. As it is a conductor, it would short-circuit the plates if allowed to come in contact with them; for this reason provision is made to allow it to drop free of them. It will at once be apparent that if sufficient of it falls to make a pile that reaches to the plates, the cell will be put out of action. The terminals extending through the case are of the same material as the plates—sheet lead—as any other material would quickly corrode from the acid fumes. In both the process of charging and discharging, hydrogen and oxygen gases are evolved by the cell, so that the necessity for sealing it to render it conveniently portable is complicated by that of permitting the escape of the relatively large quantities of gas produced. Many patented devices are used for this purpose, that shown being a combination soft rubber and glass valve. As only that part of the plates that is immersed in the electrolyte undergoes the changes mentioned and the unequal expansion and contraction would quickly ruin them, it is essential that the solution should cover them at all times, as is shown by the illustration. When a cell is charged rapidly so much gas is evolved that it creates more or less pressure and results in spraying some of the acid out the vent hole. This settles on the connecting lugs and corrodes them; such deposits should be removed with warm water, or a solution of ammonia and water; if this trouble continues the corrosion may be prevented by coating the terminals with vaseline or other heavy grease. With the exception of the outlet provided by the vent, the remainder of the top of the cell is hermetically sealed.

Rating and Its Significance.

Accumulators are always rated in terms of ampere hours—this is known as their capacity and, as already stated, it depends upon the size and number of the plates. By ampere hours is meant the length of time during which the battery is capable of giving a discharge of one ampere per hour; for instance, a 60-ampere hour battery—the size most often used on the automobile—is capable of giving a discharge of one ampere for 60 hours, 2 amperes for 30 hours, 3 amperes for 20 hours, 6 amperes for 10 hours, and so on, but there is a limit to the rate at which it should be discharged, although some makers, such as the Autex, claim that the discharge rate may be anything desired, and the Toledo, for which it is claimed that a dead short-circuit will not injure the plates, so that these two manufacturers do not caution the user as to the safe discharge rate of the cells. The amount of current demanded by the ordinary ignition system is so small that there need be little fear on this score except when things are in such poor shape as to run the battery down in a few hours—something for which the battery is most often blamed, though not at fault.

The charging rate of a cell is usually the same as its safe discharge rate and should not be greatly exceeded, if good service and long life is expected from the battery. Just what its safe discharging and charging rates may be are usually given by the maker. With all due respect to those makers whose cells will stand a dead short-circuit when fully charged, the autoist is most strongly advised against subjecting his battery to any such test, even when his only object is to see whether it is "loaded" or not. As received from the maker ,the battery is usually fully charged and ready for service. Provision for recharging must be made in accordance with the available current supply. The latter must be direct current, as an alternating current cannot be used for charging owing to the fact that it pulsates, first in one direction and then in the other, so that no matter how long a cell were connected in an alternating current circuit it would not have any more current in it at the end than at the beginning. Having ascertained that the current supply is direct, the next essentials are to determine its voltage and its polarity. The former may usually be found on the labels used on the incandescent lamps, or from the central station; the polarity will have to be determined at the point the current is to be used.

Various Methods of Charging a Cell.

The direction of the current having been ascertained, whether by a pole indicator, pole indicating paper or no other means being at hand, by dipping the bared ends of the wires into a glass of water a short distance apart, the one from which the greatest number of bubbles are given off being the negative, provision must be

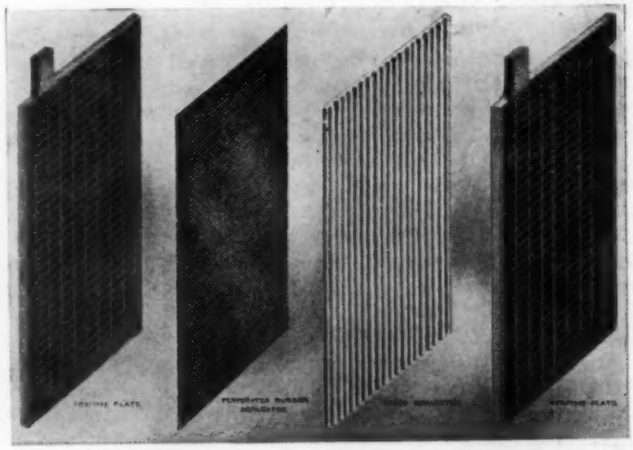


FIG. 5.—Typical group of plates, separator and insulator.

made for sending the proper amount of current through the battery. The methods of doing this are illustrated by the li sketches. Where the service is 110 volt direct current, the battery may be connected in series with a group of lamps in multiple. Fig. 7. At this potential each lamp takes approximately half an ampere of current, so that twice as many lamps as the number of

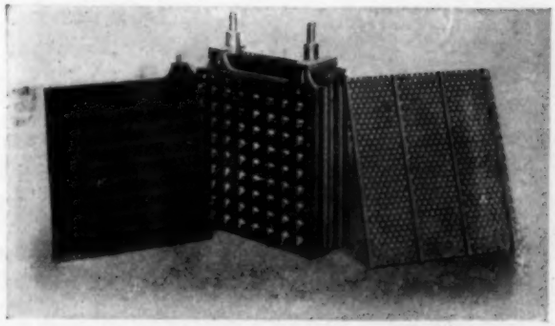


FIG. 6.—Components of Look complete unit ready for assembling.

amperes called for by the charging rate of the battery will be required; where the service is at 50 volts—rarely used nowadays—half the number of lamps will be needed, and at 220 volts double the number, as shown connected in series-multiple, Fig. 8. The sketch, Fig. 9, shows the method of charging from what is known as a three-wire system, in which two 110-volt generators are used

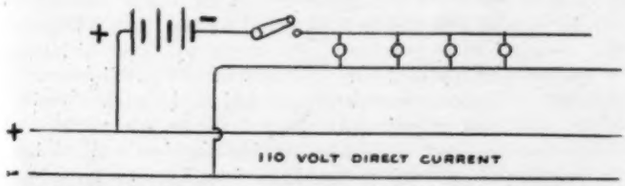


FIG. 7.—Wiring diagram for charging from 110v. direct current with incandescent lamps as resistance.

on three feeders. Any two except the outside pair will give a potential of 110 volts, so that connections may be made as shown; in this the resistance has been omitted, the instrument shown being a circuit breaker to cut out the battery should the charging current cease. Unless provision of this kind is made, the cell will discharge should the generator stop. In Fig. 10 a method of charging from a low voltage generator carried on the car and which is also used for ignition current directly, is shown; when the switch is on the upper point, the battery is supplying the coil and is being charged at the same time from the dynamo; should the motor stop the automatic cut-out prevents the battery from discharging through the dynamo and when it starts again the battery must be connected to receive the charge. On the lower point, the dynamo supplies current directly to the coil. Figure 11 shows an improvement on this method, employing an automatic switch; in this case, the switch takes care of the charging current at all times and the current for ignition is always taken from the battery. This is the method used in the Apple system, the wiring diagram of which is illustrated in Fig. 12, a volt-ameter being mounted on the panel to give the charging rate and the voltage of the cells.

Shortly after being placed on charge, the voltage rises to 2, quickly increases to 2.2, and then gradually rises to 2.3, at which what is commonly known as "boiling" begins, but which, as already mentioned, is the evolution of hydrogen and oxygen. Above this voltage it becomes very active and the cell actually appears to boil, the ebullition is so strong. The charging should not be continued after the cell shows 2.5 volts while on charge; immediately after disconnecting the reading will be considerably less. In the case of the three-cell battery this means that when approaching repletion the battery itself has a potential of about 7 1-2 volts, so that the source of charging current must be higher than this, otherwise the battery will neutralize it, and either discharge back through the source of current by reversing its polarity or cease to charge. Bubbling is not a certain test of the state of the charge nor, for that matter, is the use of an ordinary pocket voltmeter, or a small lamp. The only really accurate test is that of the specific gravity, the density always being a good indicator of the state of the cell, the electrolyte becoming lighter as the charge proceeds and heavier as the cell discharges. When fully charged, the proper density is 1.225 and 1.125 when practically exhausted.

Caring for Accumulators.

Both the service to be had from an accumulator and the length of its life will depend upon the care given it. There are numerous cases on record where an accumulator has served for an entire season with but a single recharging and some instances where it has not been recharged at all during that time, but whether used steadily or not, it is a good plan to charge more or less frequently at a low rate once a fortnight or once a month, as this keeps the cells in better condition. It must be borne in mind, moreover, that ignition work is about the most exacting service that an accumulator is called upon to perform; it is seldom called upon to work steadily for any length of time, it is given but little attention and the conditions of service are all against it. The vibration and jolting hasten disintegration and are apt to cause the active matter to loosen, and defects in other parts of the system are apt to run down the cells in a short time so that caring for the accumulator really involves the care of the remainder of the ignition system more than it does that of the battery itself, for if the latter be kept properly charged it will seldom fail to give satisfactory service, other conditions being favorable. For instance, the average coil when in good working order only requires .50 to .75 of an ampere, and a 60-ampere hour set of accumulators when working on such a coil should accordingly give the equivalent of 75 to 120 hours of continuous service. When it is found that it gives but a fraction of this, a defect should be looked for in the wiring system rather than in the battery itself, and the misplaced remedy of using more current than is necessary should not be resorted to; if the system will not run on less than one ampere there is something wrong with it. The cells should be tested with a low-reading voltmeter while the motor is running, as it is one of the peculiarities of the accumulator that it will apparently recuperate on open circuit and show a comparatively high voltage reading though practically exhausted. The coils should also be tested with a low-reading ammeter and adjusted to take the minimum amount of current. The voltage test on the accumulators should be made from time to

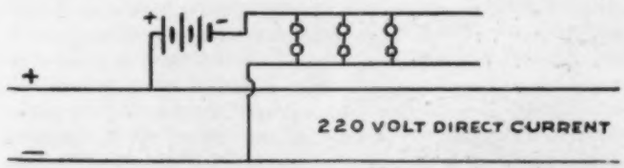


FIG. 8.—Charging from 220v. direct current with 110v. lamps as resistance.

time so as to guard against running them down too much; when found to be in the neighborhood of 1.8 they should be recharged without delay. If this be not done the battery is apt to stop working very abruptly, and then usually everything else but the cells will be suspected. The latter should never be tested with an ammeter, which short-circuits them, or in any other way by

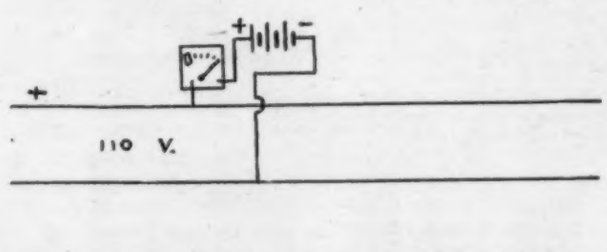


FIG. 9.—Method of wiring for charging from a three wire system with automatic cutout, no resistance shown.

short-circuiting them, such as placing a screwdriver across the terminals. It is harmful to the battery and in the case of the ammeter is apt to be so to the instrument also.

Some Questions Answered.

The following are a few of the questions that continually crop up, these being taken from the letter of an autoist seeking infor-

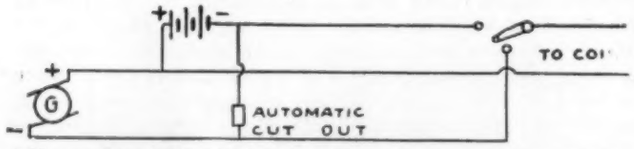


FIG. 10.—Charging directly from a low voltage generator carried on the car

mation on the subject: "What is the duration of life of the accumulator?" This is something that cannot be answered definitely, for with reasonable care accumulators have been known to give steady service for several years and still test close to standard requirements at the end of that period, while in other cases they have lasted but a short time. It is somewhat akin to asking

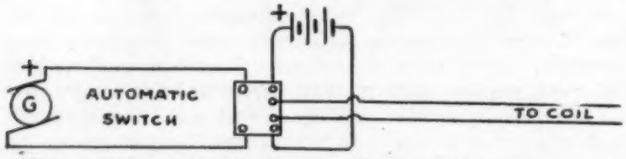


FIG. 11.—Wiring diagram for dynamo and accumulators on car, using automatic switch, usually mounted on dashboard.

how long a man should live. "When partially discharged and standing quiet, will they run down like dry-cells, and why?" Some makers claim that their cells may be left partially or wholly discharged indefinitely without harm, but the average accumulator runs down under such conditions and loses in efficiency because of the formation of sulphate of lead on the plates which covers them and insulates them from the action of the electrolyte. The so-called running down is due to what is known as local action; that is, the cell works internally while not in use and this cannot be wholly prevented. "How far can they be discharged safely, and why not more?" Both parts of this question have already been answered, the former in this part of the article and the latter in the one that preceded it. Absolute exhaustion is considered to occur when the cell only registers 1.7 volts under load; that is, sparking the motor or other duty, and the reason why it is not safe to go below this limit, as already pointed out, is that the formation of sulphate of lead would occur to an extent where the cell would be ruined. "How can some batteries give more ampere hours than others, as advertised?" This has also been answered; merely because they have a greater amount of surface. "What will cause short-circuiting in the battery?" The loosening of the active material to such an extent that it piles up on the bottom of the cell to the level of the plates or is caught between them. As most ignition accumulators are hermetically sealed in opaque cases, there is no way of telling when this has occurred. The best remedy is to return the battery to the makers. "Why do plates buckle when not charged properly, and what is the remedy?" This, also, has been explained in the foregoing. "What is the average mileage of a battery with a high-speed four-cylinder engine?" Probably a good average would be 800 miles, but there are cases innumerable where this has been greatly exceeded, and, as already stated, everything depends upon the condition of the ignition system itself, the coils, timer, plugs, etc. It is nothing uncommon for a battery to serve for 1,200 to 1,500 miles' running, though it is equally common for them to give out at the end of less than 500 miles, but the fault usually lies with the driver rather than the battery. To sum up, given reasonably good care, which means proper charging, maintaining the electrolyte above the plates by replenishing with distilled water and attention in other ways already pointed out, a good battery will last three or four years and give excellent service.

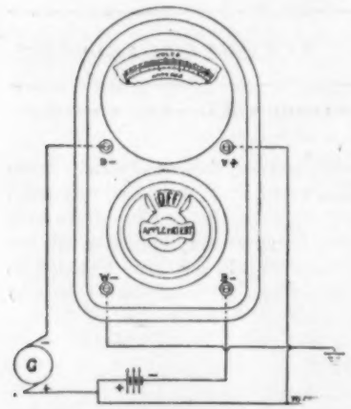


FIG. 12.—Connections of generator and accumulators with automatic switch as employed in the Apple system.

INCREASE IN AUTO PRODUCTION.

In the course of five years, as revealed by a statement recently made public by the Census Bureau, the production of automobiles in this country rose from 3,723, with a value of $4,748,011, to 22,830, valued at $26,645,064, the first figures representing the output in 1900 and the second those of 1905. This represents an increase in value of 261.1 per cent. Of the 21,692 cars turned out by regularly established factories no less than 18,699, or 86.2, were driven by gasoline; 1,562, or 7.2, by steam, and 1,425, or 6.6 per cent., by electricity. A total of 121 establishments is reported as building complete cars and nothing else, besides which there are 47 primarily devoted to the manufacture of some other line, such as bicycles, sewing machines and the like. During the year covered by the census these factories turned out 1,138 automobiles, valued at $879,205, and there are in addition 57 factories which manufactured automobile bodies and parts to the value of $3,388,472.

The total number of cars made is again subdivided, and it is interesting to note that 12,131, or 55.9 per cent., were of the runabout type; 7,220, or 33.3 per cent., were touring cars. Buckboards came next on the list, with a total of 675; Stanhopes fourth, with 520, and delivery wagons fifth, with 411. In the period between the years 1900 and 1905 the number of factories turning out finished automobiles as their principal product increased from 57 to 171, and the capital invested in these establishments from 5,768,857 to $20,555,247; in the same time the average number of employees rose from 2,241 to 10,239. The value of American made machines exported increased from $948,528 in 1902, the first year they were separately reported, to $2,481,243 in 1905, or a gain of more than 250 per cent.

ON FAKING CASTINGS.

W. J. MAY IN THE *ENGLISH MECHANIC*.

The cost of a finished casting must, to some large extent, depend on the cost of the metal, or metals, of which it is composed, and therefore for a good many purposes the cost of the castings will be found to vary from time to time. Now, at the present time, copper, tin, zinc, and antimony are high in price; consequently brass and gunmetal and other alloys must be higher in price if the weight and quality be the same as when the component metals are cheaper. Of course, the expert metal-mixer can "fake" his mixtures, and in many cases "load" them with lead, proper treatment making it quite impossible to detect the tricks unless chemical analysis be resorted to; but, as a rule, metals which are faked up do not stand wear well, and although the prices of castings per pound may be kept down, really the increased weight of each casting counterbalances any saving there may be in the cost per pound. In fact, it often happens that castings at, say, one shilling per pound, actually cost less than others at eleven pence per pound, and this simply because the more expensive castings weigh less than the cheaper ones.

But in addition to this the difference in initial cost will be found to be more than offset by the greatly lessened service to be obtained from the cheaply loaded alloy.

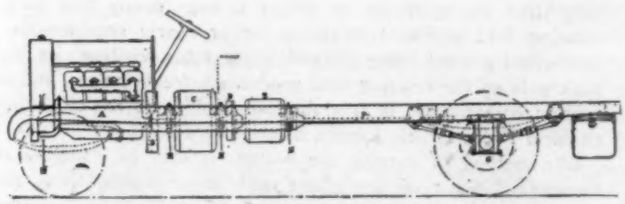
ELECTRIC VERSUS MECHANICAL TRANSMISSION

By E. W. HART and W. P. DURTNALL.

ONE of the most attractive subjects connected with the automobile is the transmission of power to the road wheels. The subject is a very large one and for thorough treatment would require more space than is available in this paper. Next to the engine, the power transmission is the most important thing about the vehicle, and bad design may make a great difference in the power obtained at the road wheels. It has been proved, by actual tests, that fully one-half of the power developed by the engine is often lost in undue friction between the prime mover and the wheels. The system mostly used at the present time is, in reality, a group of three or more rotating levers, providing not only a reduction of speed but also a fairly proportionate increase of torque at the slower vehicle speeds, something which is absolutely necessary, especially when climbing severe grades. But it must be admitted that beside having other disadvantages this system is exceedingly noisy when the gears are worn. We feel sure that it will be universally agreed that if the gear box can be satisfactorily eliminated it will be a welcome improvement.

Electrical Power Transmission.

That otherwise ideal prime mover, the internal combustion engine, has one great fault: it is wanting in elasticity, and, in order that it may be satisfactorily adopted, some sort of variable speed-changing device is necessary. In gasoline-electric systems, the arrangement usually employed is that of a dynamo coupled



HART-DURTNALL GASOLINE-ELECTRIC BUS CHASSIS.

direct to the engine and furnishing current for a motor coupled mechanically to the road wheel. The vehicle is, actually, an electric car having, in place of the usual battery a generator set. But a true gasoline-electric car is not restricted to any radius of action and requires no re-charging. Probably the earliest system employed was that of Patton (1890) in America, using street cars carrying accumulators and employing a small gasoline engine and dynamo to charge the battery. The engine was always run at full load, the current being taken from the battery for the two electric motors. Beside being complicated, the efficiency of such a system was low.

In the Dowsing system a shunt-wound dynamo was employed, both engine and dynamo being belted to the road wheels and so arranged that the surplus power from the engine was converted into current by charging a battery. When the speed fell below normal the dynamo became a motor, fed from the battery and assisted the engine on inclines. This system showed a higher degree of efficiency than that of Patton. In the Germain system the dynamo field revolved round the armature and the torque there produced was utilized in connection with the current generated to start the car. This permitted a good portion of the mechanical power of the engine to be transmitted direct to the road wheels. A switch was closed in starting, permitting the field to build up and, with the motor, producing full torque. Then the resistance was thrown in shunt with the motor, thus gradually cutting it out and causing the speed to rise. The dynamo being series wound, when the difference in speed between the field and armature was small, it formed a powerful magnetic and flexible coupling, varying in accordance with the demands made upon it.

The Hart and Other Systems.

The Hart system, first introduced in 1903, consisted of a 40-horsepower gasoline engine directly connected to a compound-

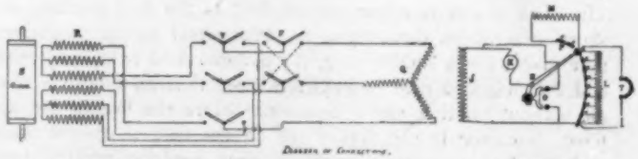
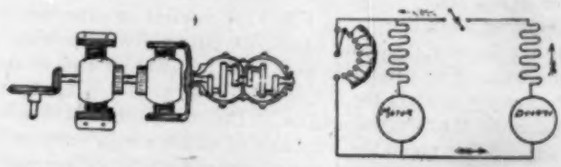


DIAGRAM OF CONNECTIONS, HART-DURTNALL SYSTEM.

wound dynamo. The current generated was sent through a series-parallel controller, to a motor having two distinct windings on both field and armature. Various speeds were thus obtained, the motor being geared by a single reduction to the differential countershaft and a double side-chain drive being employed; for low speeds a metallic resistance in series with the motor was used. This was the first high-powered gasoline-electric car built and has only just been exceeded by the 45 and 70-horsepower car of the Mercedes Electric Company. With a touring body, it weighed under 2,500 pounds and easily attained a speed of 50 miles per hour.

The Fisher system consists of the usual continuous-current generating set, the dynamo being connected, through a series-parallel controller, to two 7 1-2-horsepower series-wound motors, each coupled through a double-reduction spur and pinion gear to the rear wheels. Surplus current is utilized for charging a set of 150 ampere hour accumulators. With complete equipment this vehicle weighs over 7 tons.

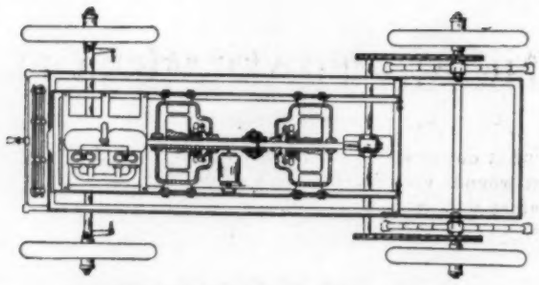
A heavy lorry of this type was taken and converted to the Hart-Durtnall continuous-current system. The battery was eliminated and the winding of both generator and motor altered so as to provide for about twelve different speeds, or torque values. The connections as now used are shown by the cut. Assuming that the engine runs the dynamo at constant speed in the switch position shown, no current is generated as no field windings are in circuit. By moving the switch along the contacts the field winding comes into circuit and a low E.M.F. is generated. Current goes to the motor, producing sufficient torque



[GERMAIN SYSTEM AND DIAGRAM OF CONNECTIONS.

to start the car; owing to the voltage building up very gradually, starting is much more smoothly effected than is possible with the constant-voltage and series-parallel method. To increase speed it is only necessary to move the switch further, cutting out some of the field windings and raising the voltage; for hill climbing a central position of the switch permits the greatest amount of power to be transmitted with full field on both dynamo and motors; for very steep hills some of the dynamo windings

*Extract from paper read before the Society of Motor Omnibus Engineers, London.



CHASSIS EMPLOYED ON THE CAROLAN SYSTEM.

can be cut out, giving a heavy current at lower voltage and producing a heavier torque at lower speeds at the road wheels. The main circuit is never opened, and as the field sections are short-circuited on themselves, no detrimental astatic discharges take place; for a sudden stop, the dynamo field is bridged over, and the magnetic field immediately lost; thus all power is shut off without altering any connections before the brakes are applied; immediately the brakes are off the field is opened again and the dynamo voltage gradually rises, securing perfect starting with constant acceleration.

Some Continental Systems Considered.

The Lohner-Porsche system has recently been adopted by the Mercedes Electric Company, the motors being placed in the hubs of the rear wheels. This disposition cannot be accepted as an efficient one; our experience shows that after a few hundred miles on rough roads the brush gear requires costly attention owing to the chattering of the brushes on the commutator. To reduce this as much as possible the 12 sets of brushes in each motor are thrust on horizontally, which is not an economical form of construction.

The Krieger is what is known as a constant-power system and it has been employed on quite a number of cars. The principle is that of maintaining a practically constant Watt output, *i. e.*, a small current at high voltage for speed on the level, or a heavy current at low voltage for hill climbing. No series-parallel working is utilized. In the wiring diagram, *A* is the dynamo armature; *B*, the self-exciting shunt winding; *C*, independent exciting winding, also on dynamo field; *D*, accumulators for maintaining excitation and running dynamo as motor to start engine; *E*, resistance controlling charging current when running; *F*, series-winding arranged to demagnetize dynamo field; *G*, motor armature; *H*, series excitation of motor; *I*, demagnetizing coil excited by dynamo armature. This is an ingenious method of transmission, the use of but one dynamo and one motor arguing well for efficiency.

The Pieper system, known in England as the Auto-Mixte, employs a single dynamotor and a set of accumulators. The dynamotor is direct-connected to the engine and electrically through a controller to the accumulator; it works as a dynamo or motor according as its E.M.F. is inferior or superior, to that of the battery, yielding additional power for propulsion when climbing. The battery is also used for ignition and to run the dynamotor to start the engine; this current also is used to automatically throttle the engine. The dynamotor is fitted with commutating poles, the windings of which are in series with the armature, insuring good commutation with heavy currents, and with a weak main field.

Characteristics of English Systems.

The Astle-Wallis is an English system that appeared in 1901. It consisted of a 10-horsepower, two-cylinder engine coupled through a friction clutch to a four-pole shunt-wound motor, and a set of accumulators. To start, the motor was run from the accumulators; as soon as the engine came up to half normal speed it automatically began to charge the battery; then by means of a planetary gear the car was practically started on the direct drive after which the motor aided the engine to accelerate the car's speed. When running at normal speed the surplus power ran the motor as a dynamo and charged the accumulators. On hills this was reversed, the dynamo running as a motor and assisting the engine, the whole arrangement being automatic. An eight position controller embodying a carbon break-switch was employed; this severed the circuit when the brake was applied and did not close it again until the controller was placed in the off position. Running down hill the clutch was withdrawn, and the engine stopped, the kinetic energy of the car being utilized for charging.

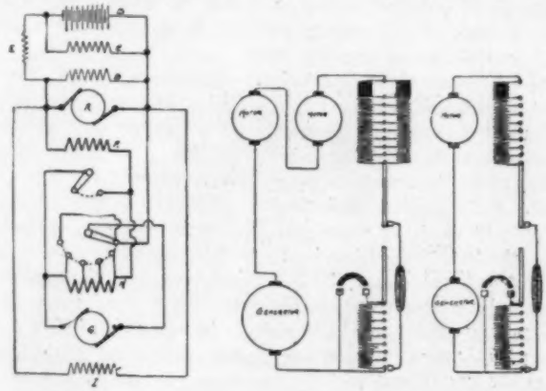
The Stevens is a continuous-current system utilizing two electric motors with the series-parallel method of control on both the motors and the dynamo, the latter being double wound with two commutators and two separate field windings. A pedal-operated resistance opening the main circuit when changing speed is employed to prevent sparking. From an electrical point of view this system has many good features, as in climbing, the dynamo winding can be put in parallel and the engine run at full speed, while the car travels at about quarter speed with the motors in series and with increased torque at the road wheels.

Details of the Hart-Durtnall System.

In all the systems previously dealt with, as well as those illustrated here, to which no detailed reference is made, continuous current is utilized. In the Hart-Durtnall system, polyphase, alternating-current apparatus is adopted. Chief among the advantages of the induction motor are its powerful starting torque and its freedom from commutator and brush troubles; a burnt-out armature is practically unknown. It also has the advantage of being able to start against load in contrast with the single-phase motor of the same type. As is well known, such a motor consists of but two parts, the stator and the rotor. When running light the speed of the motor is very nearly that of the rotating field produced in the stator or nearly synchronous, a very small current being induced in the rotor winding; its magnetic pole on the rotating field produces a feeble torque, and the current consumption is only that required to overcome the mechanical and magnetic friction of the motor.

The method of varying the voltage is that of changing the number of poles of the stator and so arranging them that, although the periodicity of the supply current remains constant, the motor can turn at quarter, half, or full speed. The result is very similar in action to, though much more flexible than, an ordinary set of change speed gears. Other great advantages are absolute freedom from danger of mechanical injury and the small amount of insulation required on the rotor.

We show, diagrammatically, a general arrangement, in plan and elevation, of the Hart-Durtnall chassis. *A* is a 40-horsepower engine (speed, 800 r. p. m.); *B*, fan; *C*, polyphase, alternating-current generator, combined with a series-wound exciter; *D*, electro-magnetic clutch, to obtain direct drive on top speed (800

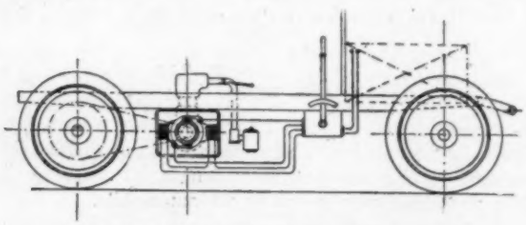


Krieger. Hart-Durtnall.

WIRING DIAGRAMS: KRIEGER CONSTANT POWER AND HART-DURTNALL CONTINUOUS CURRENT SYSTEMS.

r. p. m. of engine equals 12 m. p. h.); *E*, polyphase, alternating-current, induction motor, coupled by means of—*F*, propeller shaft, fitted with universal compensating joints to—*G*, live back axle, fitted with differential gear, etc.; and *H*, bolts to carry the whole plant, which is slung from the cross members of the chassis.

Other parts shown in the diagram are: *I*, connections; *J*, exciting, revolving field-magnet of polyphase-current generator; *K*, armature of small, continuous-current, series-wound exciter; *L*, sectional field of exciter; *M*, winding of electro-magnetic clutch; *N*, regulating switch and contacts in connection with sectional field; *O*, bridge contact-piece, for short-circuiting generator field;



SIDE ELEVATION CHASSIS OF PIEPER SYSTEM.

P, contacts for bringing into circuit magnetic clutch windings; *Q*, fixed armature winding in polyphase generator; *R*, fixed "stator" two-speed windings; S, "rotor" of polyphase motor, with short-circuited bar winding; *T*, bridge contact in connection with the foot-brake pedal; *U*, reversing switch; and *V*, two-speed switch, for starting on gradients.

The method of operation is that, assuming the engine is running at constant speed, the switch is on the forward position, the two-speed switch is on the top electrical driving speed, and the regulating switch is on position 1, no voltage being available, the driver places the switch on No. 2 contact, and a low voltage is generated, which excites the alternator field, which, in turn, generates polyphase alternating current in the generator armature-winding, from whence it is conducted, by copper bars, through the reverse and two-speed switches to the "stator" winding in the motor, producing a rotating field in the "stator"; the "rotor" then starts and endeavors to get into phase with the speed of the generator. Should the car be loaded, it may be necessary to increase the field of the exciter, in order to get sufficient starting torque at the motor, and this is done easily by bringing the switch round to No. 9 contact; when the speed of the car has risen, direct drive is obtained by moving the switch on to No. 10 contact. This move drops the magnetic clutch winding in series with the field of the generator, weakening this field and, at the same time, brings the clutch over gently into contact; the last move, to No. 11 contact, which is made immediately, causes the insulated bridge-piece to short-circuit the polyphase generator field. It will be observed that the exciter then only supplies current to the magnetic clutch winding, which grips solid, and the direct drive on top speed, from engine to back axle, is obtained, the generator and motor being out of action.

"AUTOGENOUS" WELDING PLANT OPENED.

The Worcester Pressed Steel Company, Worcester, Mass., manufacturers of pressed steel parts for automobiles and similar work, have just installed a plant for autogenous welding with the oxy-acetylene blow pipe flame. This is the only plant of its kind in Worcester, and but the second to be put in operation in this country. The value of such a plant lies in the fact that the oxy-acetylene flame is the hottest known, reaching a temperature of 6,300 F. or 2,700 degrees higher than that attainable with the oxy-hydrogen blow pipe. The gases are used in equal parts at a pressure varying from 15 to 150 pounds to the square inch. The process will be employed in place of riveting and soldering, tank making and other forms of construction hitherto found too difficult with the means available. It will also be used for cutting steel, as with the plow pipe the operator will be able to do work impossible with the saw.

FIRST PNEUMATIC TIRE EXPERIMENTS WERE INTERESTING.

IT is curious that the man who first produced a pneumatic tire should have had no connection with the rubber industry, the bicycle trade, or even with any branch of mechanics. J. B. Dunlop was, indeed, a veterinary surgeon practising in Belfast, Ireland. He had at various times given some thought to a new wheel which would reduce vibration, but never put any of his theories into practical form. Towards the end of 1887 the idea came to him of fixing an air cushion around the rim of a wheel, and he mentioned the scheme to his son, who then rode a solid-tired tricycle. The boy, who had experienced the nerve-racking sensation of riding over roughly paved roads and was also anxious to ride faster than his companions, urged his father to experiment the new idea. Dunlop procured a disk of wood about 16 inches in diameter and one and one-half inches thick. He constructed an air tube out of the purest stock sheet rubber one-thirty-second of an inch thick, and inserted in the tube, for the purpose of inflation, a short piece of rubber tubing commonly in use for children's teething bottles, placed the air tube on the periphery of the disk of wood, covered the air tube with a strip of thin linen cloth, and secured the cloth in a temporary manner to the disk of wood by means of small tacks. The tire was inflated by means of a football pump and the tube fastened by means of a piece of thread.

One evening in December, 1887, when the yard gates had been closed the first experiment was made in the presence of Dunlop, his son, an assistant, and a friend who was interested in cycling. First a large solid-tired wheel was thrown towards the gate, but it did not run the whole length of the yard. The small pneumatic-tire disk was thrown in the same manner. On the first attempt the disk struck the side of the wall; on the second attempt, however, it ran the whole length of the yard, struck the front gate and rebounded with considerable force. Further experiments only showed the superiority of the pneumatic-tired wheel over the solid. After the rolling friction test the wheel was tested for its resiliency. When dropped to the floor from a height of about four feet it was found to rise to nearly the point from which it started. These experiments were explained to R. J. Mecredy in 1889 and about the same time were made known to the public. The first pneumatic-tired safety bicycle was designed with a view to its being ridden at a race meet on a cinder track in England, but was not finished in time for the event.

Judging from an examination of new models, the heavy high-power motorcycle, which a few years ago enjoyed much popularity, has lost favor. Everywhere the medium and light-weight machine is being more extensively adopted. In France there is a momentary boom on the motor-bicycle. Most of this type carry a single cylinder engine entirely within the frame, and when the magneto is used it is placed above the crank case and below the top stay. Other machines of this type have the engine attached by lugs to the forward down stay of the frame, immediately behind the front wheel. The space within the frame is thus left free for gasoline tank, etc.

THEORY OF BRAKE POWER AND ADHERENCE*

YOUR automobile is rolling along at twenty, thirty, or forty miles an hour. Suddenly an obstacle is seen ahead—a cow, a horse, a team leaving the fields—and you have to stop in the shortest space possible. You throw on your brakes desperately, and just avoid an accident which might have been fatal, and which certainly would have been unpleasant. When running home the probability is that you ask yourself if it is not possible to know, even roughly, what is the minimum length in which your car can be pulled up.

To this it may be replied that it is generally possible to know approximately in what length the car can be stopped if the speed of the machine is known at the moment when the maximum braking effect is applied. By maximum braking is meant blocking the wheels, for it is only when the wheels are blocked that the maximum effect is obtained, and consequently a stoppage in the minimum distance. To stop any moving body some power must be brought into action, and there must be a fulcrum. This latter is essential, and no engineer has doubted its necessity since Archimedes first showed us its value. The force is to hand in the shape of the brake lever, but the fulcrum is on the road, and the resistance of this fulcrum is limited in value to the adherence of the brake wheels to the road, or in other words, to the value of the force producing the sliding of the wheels. It is clear that the force with which an automobilie can be braked cannot be superior to, though it may equal, the adherence of the brake wheels; this adherence is therefore the superior limit of the braking power. What is the value of this resistance?

The Theory of Braking Effect.

Experience alone can reply to this question, and the answer she gave us two or three years ago was that on a normal road, dry but not dusty, the adherent force of a pneumatic tired wheel was between 63 and 67 per cent. of the force with which the wheel is applied normally to the road, so that the coefficient of adherence with which a pneumatic tired wheel is resting on a given plane is equal on an average to 0.65. This is a value from 40 to 50 per cent. higher than those determined by Morin fifty years ago for metal-shod wheels.

This obtained, a knowledge of the speed of the vehicle at the moment of maximum braking effect and of the coefficient of adherence given above multiplied by the relation of the weight carried by the braking wheels to the total weight, a relation easily obtained by means of a scale, is sufficient to obtain the minimum length corresponding to a complete stop. Mechanics have shown, and experience has confirmed the demonstration, that a moving body weighing P, with a velocity V, has a quantity of work measured by the product FL of the force F by the displacement L of its point of application, and such that there is always equality between the quantities PVF and L:

$$FL = \frac{P\,V^2}{2\,g}$$

in which g designates a constant coefficient equal to 9.81. If the force F acting on the vehicle as a brake is constant, the preceding relation gives us the length

$$L = \frac{P\,V^2}{2\,g\,F}$$

of the distance necessary to obtain a complete stop. This distance will be proportionate to the square of the velocity and, for a given value of speed, will be in inverse proportion to the braking force F. It has just been shown that this force F has as its maximum limit the product Pa of the weight P of the machine by the coefficient of adherence a = 0,65. This would thus give for L the value

$$L = \frac{V^2}{2.\,g.\,a} = \frac{V^2}{2.\,9{,}81.\,0{,}65}$$

if all four wheels were blocked. But as only the driving wheels are braked, and as these support generally about half the weight of the vehicle, the preceding relation gives for a stopping distance

$$L = \frac{V^2}{2.\ 981.\ 0{,}325} = 0{,}157\ V^2$$

of the double values.

It is this last formula which has been used to calculate the following table giving the minimum length of stopping, corresponding to the different speeds of the automobile.

TABLE INDICATING MINIMUM LENGTH AND TIME IN WHICH AN AUTOMOBILE CAN BE STOPPED.

Speed per Second		Speed per Hour		Distance		Duration
Meters	*Yards*	*Kilometres*	*Miles*	*Metres*	*Yards*	*Seconds*
1	1.093	3.6	2.236	0.157	0.171	0.31
2	2.187	7.2	4.473	0.628	0.686	0.63
3	3.280	10.8	6.710	1.413	1.545	0.94
4	4.374	14.4	8.947	2.51	2.745	1.25
5	5.468	18	11.184	3.93	4.297	1.57
6	6.561	21.6	13.421	5.65	6.179	1.88
7	7.655	25.2	15.658	7.69	8.410	2.20
8	8.749	28.8	17.895	10.04	10.980	2.51
9	9.842	32.4	20.132	12.72	13.811	2.83
10	10.936	36	22.369	15.70	17.170	3.14
15	16.404	54	33.554	35.37	38.683	4.71
20	21.872	72	44.739	50.80	55.558	6.28
25	27.340	90	55.924	98.125	107.286	7.85
30	32.808	108	67.100	141.30	154.536	9.42

The duration T of this distance, easily calculated by the known relation

$$F\,T = \frac{P\,V}{g.}$$

existing between a propulsion F T produced by a constant force F acting during time T on a moving body weighing P, to which it communicates or reduces to zero the speed V. In the present case we have T for the duration of the stopping distance.

$$T = \frac{V}{g.\,a} = \frac{V}{9{,}81.\ 0{,}325} = 0{,}314\ V$$

To sum up, if the distance corresponding to the complete stoppage of the automobile is proportionate to the square of the speed of the vehicle, on the other hand its duration is simply proportionate to this speed. To be absolutely correct we ought to have taken into account atmospheric resistance, which naturally tends to reduce the length of the stopping distance; but this has not been done because calculation has shown that its action was felt at the commencement of the braking effect, and would only very slightly modify the results of the preceding table in the practical limits in which we have considered the question.

*By René Arnoux, Vice-president Technical Commission A. C. of France. Translated from *Omnia*, by W. F. Bradley.

AUTOMOBILES IN POLAR EXPEDITIONS.

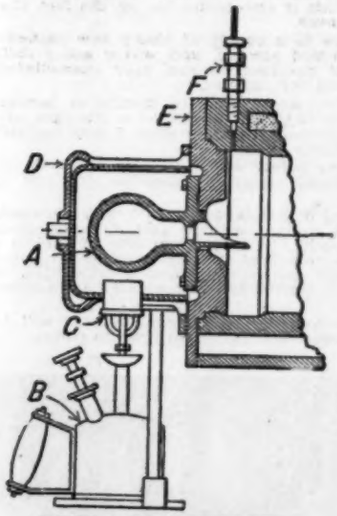
The automobile will play an important part in scientific expeditions to the Polar regions this year. Walter Wellman, who is now fitting out in Paris for a dash to the North Pole, has had a special automobile constructed at the De Bion Bouton factory, to be used in the final dash to the pole. The British expedition to the South Pole under the command of E. H. Shackleton, who was third lieutenant on the *Discovery* on its expedition to the Antarctic, will also be supplied with an automobile specially designed for ice travel.

USE OF ALCOHOL AND GASOLINE IN FARM ENGINES*

By CHARLES EDWARD LUCKE, M.S., Ph.D., and S. M. WOODWARD, M.S., M.A.

THE determination of the position of the alcohol engine today involves a forecast of the future, and should it be shown to be able to compete now it must inevitably reach a stronger and more important industrial position as time goes on. This is the fact that has led governments to take up the question, and among them the United States is the latest. Exploding engines operating on crude oil will average about 25,000 heat units per brake horsepower hour, which is equivalent to about 10 per cent. thermal efficiency; engines using gasoline should operate at a thermal efficiency of about 19 per cent. under similar operating conditions.

The efficiency of an alcohol engine may be assumed at this time to be unknown, but as alcohol can be burned in engines designed for gasoline, it may be assumed that such an engine will have with alcohol fuel the same thermal efficiency as with gasoline.



MEITZ & WEISS KEROSENE VAPORIZER.

The first serious attempt to examine into the possibility of alcohol as a fuel in competition with petroleum seems to have been made in 1894 in Leipzig, Germany, by Professor Hartman. The engine used was built to operate on kerosene, and used 425 grams of kerosene per hour per brake horsepower, which is equivalent to 0.935 pounds, or 1.1 pints, approximately. This indicates for kerosene a thermal efficiency of 13.6 per cent. When operating on alcohol the engine used about twice as much, or 839 grams, which with this kind of alcohol was equivalent to a thermal efficiency of 12.2 per cent., or a little less than with kerosene. This experiment would seem to indicate that, compared with kerosene, alcohol, as a fuel, offered very little chance for successful competition. In spite of this, investigations were continued and the results of this development may be summed up by stating that the thermal efficiency has been raised to something over 30 per cent.—quite a remarkable showing, in comparison with the original figure. This indicates that with a motor specially constructed for alcohol, the price per gallon might be twice as much for the latter as for petroleum, and still produce power for less money, assuming all other conditions, such as cost of attendance, lubrication, etc., being the same.

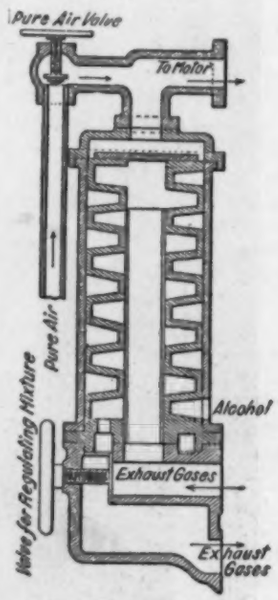
Results of Government Tests.

The Office of Experiment Stations of this Department, in connection with its Irrigation and Drainage Investigations, has tested a number of different types of gasoline engines with alcohol and obtained figures which show the comparative consumption of gasoline and alcohol in the same engine. The first tests were made without any particular attempt at obtaining the best adjustment of the engine for each fuel, and showed a consumption of alcohol two to three times as great by weight per horsepower hour as was necessary with gasoline or kerosene. These figures indicate the necessity or desirability of determining the proper conditions of adjustment, because these were found to have a serious influence on the amount of fuel consumed. With care in adjusting the engine so as to secure the most economical use of the alcohol, it was found that, under like conditions, a small engine consumed 1.23 pounds of alcohol to 0.69 pound of gasoline per brake horsepower hour—that is, with the best adjustment of the engine for each fuel there was required 1.8 times as much alcohol by weight as gasoline per brake horsepower hour. It was also shown in making this adjustment that it was possible to burn more than twice as much alcohol as stated, by improper adjustments, and still have the engine working in an apparently satisfactory way. The range of excess gasoline which might be burned without interfering seriously with the working of the engine was not so great, being a little less than twice as much as the minimum.

*Extract from Bulletin No. 277, U. S. Department of Agriculture.

Special Vaporizers Employed.

There is on the American market a class of engines having a vaporizer which forms part of the cylinder head and which is heated by the explosions taking place inside the exploding chamber. One of these is shown in Fig. 7. On this figure, A is the vaporizer proper. Under it is seen a lamp (B), the burner and vaporizer being surrounded by a casing (D). This vaporizer is bolted to the cylinder head (E), and contains on its inner end a lip projecting into the exploding chamber. A little pump injects a small stream of oil at every stroke and drops it on this lip from the pipe (F). This lip is very hot from previous explosions and from the lamp, which is turned off when the engine begins work. The compression stroke forces the air in the cylinder over the lip and through the neck into the vaporizer bulb, thus mixing more or less completely the vapor which forms on the lip with the air that is forced over the lip into the bulb. Such hot-bulb vaporizers as this will work with practically all of the fuels—crude oils, gasoline, kerosene, and alcohol—with proper adjustments of the pump and of the temperature of the receiving bulb.



BROUHOT ALCOHOL VAPORIZER.

Another vaporizer of a similar order, but designed especially for alcohol, illustrated in Fig. 8, is known as the Brouhot, a French type. Exhaust gas enters at the bottom, as shown by the arrow and lettering on the cut, and rises through the iron chamber, which is corrugated to increase the surface. Alcohol is admitted near the bottom of these ribs, and flows upward on the side opposite to that heated by the exhaust gases. The regulating valve is attached to permit some exhaust gases to pass around the heating chamber and so vary its temperature, but the regulation must be done by hand. Vapor rising from the surface of the alcohol in the top of the chamber meets air, which passes first through the regulating valve intended for the adjustment of proportions. The corrugations are such as to form a screw thread or a helix passage, and the exhaust entering first at the bottom, passes directly to the top of the chamber and downward in the helical groove to the bottom, so that the top of the helix will be the hottest part. Alcohol enters the bottom of the opposite helix, flows upward and vaporizes somewhere in its upward course, discharging into the air current at the hot top of the helix as superheated alcohol vapor. This vaporizer is,

therefore, of the boiling type, but the boiling takes place on the surface of the liquid which is at the pressure in the suction pipe, and the rate of boiling is regulated by hand by admitting more or less exhaust gases to the vaporizing helix.

Separate vaporizers as distinguished from carbureters are essential for kerosene and common for alcohol. They have been described at this point because the principles of their operation are simpler than those of carbureters, and they are less numerous and less representative. Carburetion is a process distinctly different from boiling. Air may take up the vapor of a liquid just as it takes up the vapor of water, even when the temperature of the liquid or the temperature of the air is very considerably less than the boiling point of the liquid. * * *

Conclusions.

The following conclusions regarding the use of alcohol as fuel for engines as compared with gasoline are based on the preliminary results of the Department's experiments, upon results of the European experiments and investigations which have been presented in the foregoing pages, and upon the general knowledge of the authors:

(1) Any engine on the American market to-day, operating with gasoline or kerosene, can operate with alcohol fuel without any structural change whatever with proper manipulation.

(2) Alcohol contains approximately 0.6 of the heating value of gasoline, by weight, and in the Department's experiments a small engine required 1.8 times as much alcohol as gasoline per horsepower hour. This corresponds very closely with the relative heating value of the fuels, indicating practically the same thermal efficiency with the two when vaporization is complete.

(3) In some cases carbureters designed for gasoline do not vaporize all the alcohol supplied, and in such cases the excess of alcohol consumed is greater than indicated above.

(4) The absolute excess of alcohol consumed over gasoline or kerosene will be reduced by such changes as will increase the thermal efficiency of the engine.

(5) The thermal efficiency of these engines can be improved when they are to be operated by alcohol, first by altering the construction of the carbureter to accomplish complete vaporization, and, second, by increasing the compression very materially.

(6) An engine designed for gasoline or kerosene can, without any material alterations to adapt it to alcohol, give slightly more power (about 10 per cent.) than when operated with gasoline or kerosene, but this increase is at the expense of greater consumption of fuel. By alterations designed to adapt the engine to new fuel, this excess of power may be increased to about 20 per cent.

(7) Because of the increased output without corresponding increase in size, alcohol engines should sell for less per horsepower than gasoline or kerosene engines of the same class.

(8) The different designs of gasoline or kerosene engines are not equally well adapted to the burning of alcohol, though all may burn it with a fair degree of success.

(9) Storage of alcohol and its use in engines is much less dangerous than that of gasoline.

(10) The exhaust from an alcohol engine is less likely to be offensive, although there will be some odor, due to lubricating oil and imperfect combustion, if the engine is not skillfully operated.

(11) It requires no more skill to operate an alcohol engine than one intended for gasoline or kerosene.

(12) There is no reason to suppose that the cost of repairs and lubrication will be any greater for an alcohol engine.

(13) There seems to be no tendency for the interior of an alcohol engine to become sooty.

(14) With proper manipulation, there seems to be no undue corrosion of the interior due to the use of alcohol.

(15) The fact that the exhaust from the alcohol engine is not as hot as that from gasoline and kerosene engines seems to indicate that there will be less danger from fire and less possibility of burning the lubricating oil. This is also borne out by the fact that the exhaust shows less smokiness.

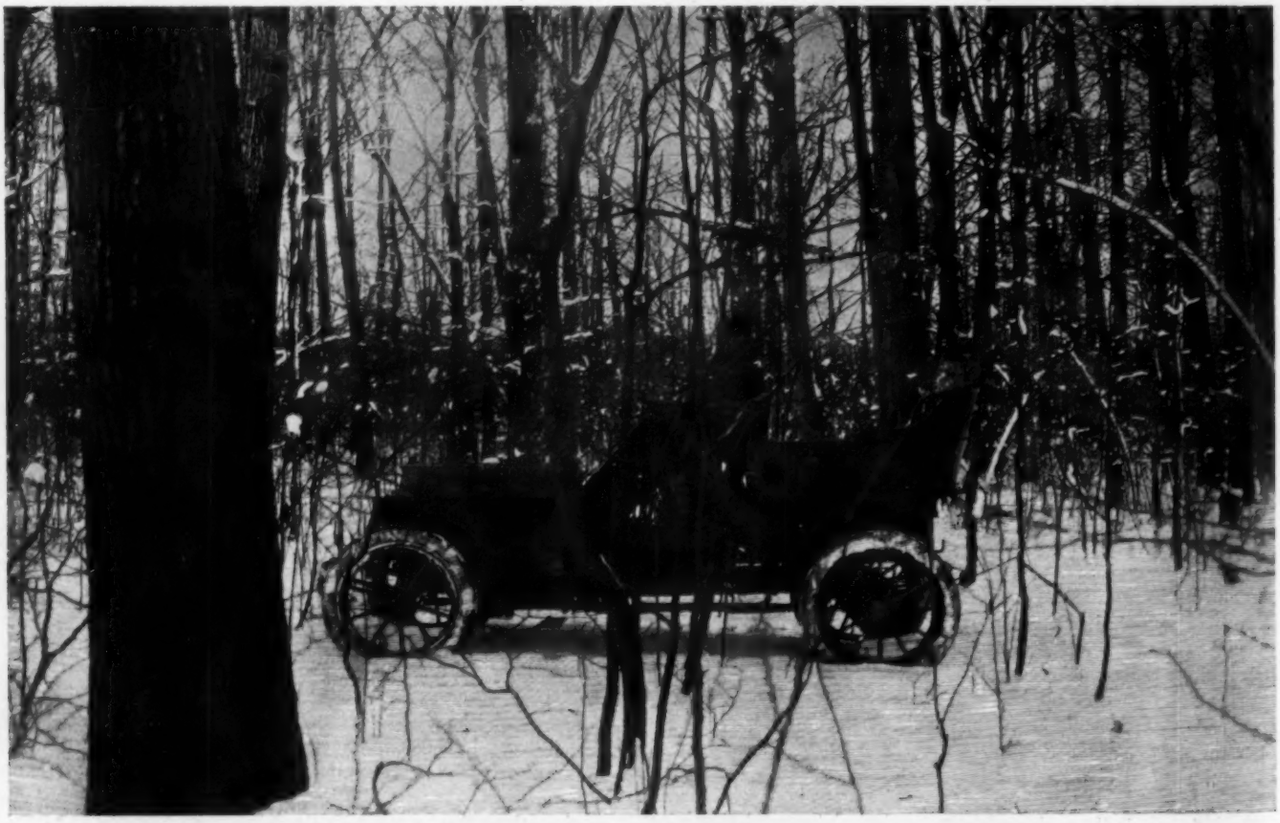
(16) In localities where there is a supply of cheap raw material for the manufacture of denatured alcohol, and which are remote from the source of supply of gasoline, alcohol may immediately compete with gasoline as a fuel for engines.

(17) If, as time goes on, kerosene and its distillates become scarcer and dearer, the alcohol engine will become a stronger and stronger competitor, with a possibility that in time it may entirely supplant the kerosene and gasoline engines.

(18) By reason of its greater safety and its adaptability to the work, alcohol should immediately supplant gasoline for use in boats.

(19) By reason of cleanliness in handling the fuel, and increased safety in fuel storage, alcohol engines will, in part, displace gasoline engines for automobile work, but only when cost of fuel is a subordinate consideration. In this field it is impossible to conveniently increase the compression because of starting difficulties, so that the efficiency cannot be improved as conveniently as in other types of engines.

(20) In most localities it is unlikely that alcohol power will be cheaper or as cheap as gasoline power for some time to come.



SERVICE TEST OF A FINISHED CADILLAC CAR IN THE SNOW-CLAD MICHIGAN WOODS.

The thermometer was at zero, and the road, or path, had not been traveled in weeks. The machine, a four-cylinder Model G, had to make its way through a heavy snow on the level and great drifts in places. No chain grips were used, the car going satisfactorily without.

LETTERS INTERESTING AND INSTRUCTIVE

Correcting a Faulty Steering Gear.

Editor THE AUTOMOBILE:

[611.]—Will you please answer the following through your valuable journal:

(1) I have a touring car which has a defective steering gear. It is of the irreversible design (worm and segment), and will only turn the front wheels half as far one way as the other. They will turn to the left all right, but will only turn to the right a very small distance. The car came to me new this way. I can see only one way to remedy it, and that is to bend the arm on the steering knuckle where the connecting rod from the segment arm fastens. Can you give me an idea as to how I can adjust it, as it makes steering very inconvenient?

(2) What damage would be done to the coil if too large a current is supplied to it? How many dry cells would you recommend for the best resuts?

(3) When one's home city does not require an owner to carry a number on his car, what requirements would it be necessary for him to follow if he should wish to operate his car or pass through some city which requires registration? A SUBSCRIBER.

Ankenytown, O.

Such a state of affairs as you describe in the first part of your letter would appear to constitute a strange oversight on the part of the factory that shipped you the car. It would appear that in assembling the steering gear, the segment was left much too far one way or the other from the center of its travel on the worm, so that as you say it has more than sufficient movement in one direction but not enough in the other. Such a car would be very dangerous to drive, and if just received new, probably the best thing to do would be to advise the maker and have him correct it. If you wish to remedy it yourself, disconnect the steering gear and take it down. See if there is anything else wrong with it other than that indicated above, and if not, turn the wheel until the segment is exactly at the center of its range of travel on the worm; that is, so that moving the wheel one way or the other will cause the same amount of movement at the lever in either direction. It may be found on dismounting the gear that something has become deranged, and that the trouble is not due to faulty assembling, but if such is not the case, centering the segment on the worm, and then after accurately centering the front wheels, reconnecting in that position, should remedy the difficulty. We should not recommend such a makeshift as bending the arm on the steering knuckle.

(2) The insulation of the secondary is apt to be broken down, either partly or wholly, by the discharge breaking through the insulation and jumping from layer to layer, thus greatly reducing or totally destroying its efficiency.

(3) It will be necessary to register in accordance with the law of the State which you wish to enter; cities in the same State very seldom have local enactments in force regarding registration, but where such is the case, it would probably also be necessary to register in such city.

Percentage of Heat Losses in Air-Cooled Motors.

Editor THE AUTOMOBILE:

[612.]—I wish to thank you for your answer to my proposition submitted some time ago concerning the relative power of an air and water-cooled motor of the same size, though I have as yet been unable to convince my friend who held the other end of the argument that I am right. If there is any accurate means of ascertaining exactly the percentage of the heat losses in engines of the air-cooled type, and this can be done, would an article on the subject be available for publication in the columns of "The Automobile"? SIDNEY BARRETT.

Carteret, N. J.

If you have made any scientific tests with a view to determining the exact percentage of heat losses in air-cooled motors, we would be pleased to have you submit an article setting forth the nature of your experiments as well as the data resulting therefrom. After seeing it we can tell you whether it will be available for publication in the columns of THE AUTOMOBILE or not.

Information Asked on Many Points.

Editor THE AUTOMOBILE:

[613.]—Will you kindly answer the following questions under the head of Letters Interesting and Instructive and oblige.

(1) An automobile owned in a State which has no registration or license law is used temporarily by its owner in another State which does have a registration or license law. Is it subject to the automobile law of such last-named State? How is it, suppose the visiting car is used in the latter State merely on a continuous journey from one to or through the other?

(2) So long as a machine will actually climb a given grade on the high gears, is there any disadvantage to the machine in using them, instead of lower ones?

(3) Scientifically, how much more resilient is a pneumatic tire, with as small an air-space as those which use the heaviest fabric and rubber, than a solid rubber tire? If two solids and two pneumatics were to be used on a touring car, where should they properly be put to get the best results?

(4) Owners seem to be recommended on all hands to use large tires. Is there not an actual limit to the size of tire that can be used advantageously on a given rim? If so, what is the limit? Assume a standard clincher rim 2 1-2 inches wide, and what is the largest tire that can properly be used on it?

(5) In comparing the resiliency of solid and pneumatic tires, what is your opinion as to the difference between unaided pneumatics and solids used with a standard shock-absorber?

Cambridge, O. GREENHORN.

(1) In the majority of States which have passed legislation on the subject, excepting those which go to radical and unreasonable extremes, such as New Jersey and Pennsylvania, non-resident owners of cars are exempted from the provisions of the statute, either altogether, as in New York, or for a limited period; as, for instance, 48 hours in Delaware and 15 days in Connecticut. But in practically every case, this exemption is conditioned upon such non-resident having complied with the laws of his home State in this regard, which means that he must display the registration number taken out there. A statute that has probably served as a model for the majority in this respect is that of New York, subdivision 9 of which reads as follows: "The provisions of this section (regarding registration and display of number) shall not apply to motor vehicles owned by non-residents of this State, provided the owners thereof have complied with any law requiring the registration of owners of motor vehicles in force in the State, etc., of their residence, and the registration number showing the initial of such State shall be displayed on such vehicle substantially as in this section provided." Michigan makes this exemption depend upon the granting of similar privileges by the State from which such non-resident hails, so that an autoist from Jersey or Pennsylvania could not travel in Michigan without registering in the latter. Though not explicitly so stated, the inference is unavoidable that an autoist hailing from a State having no legislation on the subject, would be compelled to register in the first State he entered that had such a law, and that such registration would then serve him in every other State except such as ignored the demands of comity.

(2) The mere fact that a car can be nursed or forced over a grade on the high-gear is far from constituting a reason why this should be done. The chief object of the provision of various ratios of gearing is to enable the motor to be run as nearly as possible at the speed at which it develops its maximum torque, and a skillful driver will shift gears as frequently as it is necessary to maintain this. By permitting the motor to labor and thump, many a car can drag itself over comparatively steep hills on the high gear, but it is absolutely injurious to the motor to treat it in such fashion, and shows little or no knowledge of the elements of either mechanics or driving. Gears should be shifted as soon as the motor slows down unduly, not waiting until it is about to gasp its last and then racing it as is so frequently done.

(3) So far as we know, while there is no data extant regarding the first part of your third question, there can be no com-

parison between any solid rubber tire and the heaviest pneumatics, as the air space is always proportionate to the size, regardless of the weight of the fabric or rubber. Reducing the air space would, of course, have the effect of reducing the resiliency of the tire. In using tires of both types on the same car, the solids would be put on the driving wheels.

(4) Rim sizes increase proportionately with tire sizes, and one must be adapted to the other in order to be used advantageously. For instance, the smallest tires made, which are 26 by 2 1-2 inches, take a rim 1 3-8 inches wide; a 4-inch tire takes a 2-inch rim; a 4 1-2-inch tire a 2 1-4-inch rim, so that the size tire that would give best service on a 2 1-2-inch rim would be a 5-inch. It is axiomatic that the larger the tire, the greater must be the size of its retaining beads (clincher type), and the rim must be enlarged correspondingly to accommodate them. In consequence, there is always a limit to the size of tire that can be used advantageously on a given rim, but there is nothing to prevent increasing the size of the rim. This subject was gone into at length in THE AUTOMOBILE of August 9, 1906, pp. 169-173.

(5) Concerning your last question, we should say that the unaided pneumatics would be superior to solid tires with shock absorbers, the office of the latter being more as an aid to the springs than to the tires. The limit of the resiliency of the solid tire is reached in absorbing what has been euphoniously christened "dither"; that is, vibration. Between this and the hard jolts which the shock-absorber is designed to take care of, there is a vast amount of bumping and jolting that only the pneumatic tire can efficiently cope with.

Why There Is No Danger from Backfire.

Editor THE AUTOMOBILE:

[614.]—I notice in the issue of "The Automobile" of February 21, under the head of "Letters Interesting and Instructive," letter No. 582, a question was asked reading as follows:

"We have had trouble from flashes of fire coming from the carbureter when the motor is running."

Will you kindly let me know through your columns how it is that fire can flash from a carbureter without causing a serious explosion of the mixture, and oblige a three-years' reader of your paper. J. E. R. H.

New York City.

The reason for the non-occurrence of either an explosion or the ignition of the contents of the float chamber of the carbureter, when by reason of a back fire through the carbureter flame is seen to issue from it, is due to the fact that there is nothing to support combustion there. Any mixture that might be in the body of the carbureter itself would be entirely too rich to explode, while the float chamber would, in all probability, be filled with almost pure gasoline vapor, and the latter cannot burn without oxygen. About the only point at which ignition would be apt to take place would be at the spray nozzle, of the spraying gasoline as it issued, and while there would probably be sufficient oxygen at that point to maintain a flame in a quiescent state, with the motor running, the suction would doubtless be so strong as to blow it out every time.

Why Is the Two-cycle Motor Not More Popular?

Editor THE AUTOMOBILE:

[615.]—What is the two-cycle motor? Is it practical for automobile uses? I see one concern manufactures it, and if it's such a good thing, why don't some of the hundreds of other manufacturers in Europe and America make it? INQUIRER.

Oil City, Pa.

The two-cycle, or more properly speaking, the two-part cycle motor, is a type in which, as its name indicates, there are but two parts to the cycle, so that there is an impulse given the piston every revolution, instead of every other revolution, as in the four-cycle. The induction and compression strokes of the four-cycle motor are combined in one, as are also the firing and exhaust strokes. To accomplish this the mixture is drawn into the crankcase, made airtight for the purpose, and delivered to the compression chamber of the cylinder through a bypass and port opened by the piston itself; another port, similarly operated, permitting the escape of the exhaust. For a more detailed explanation of the two-cycle motor we would refer you to the articles that have been published in the columns of THE AUTOMOBILE during the past year. While there is but one firm that builds automobiles with two-cycle motors in this country, there are probably a score or more who have been building two-cycle marine motors for quite a few years, and their output is large. The fact that the firm in question has been building cars successfully for the past six years or more would appear to answer your query regarding its use on the automobile, in the affirmative. There are also one or two firms on the other side who have built two-cycle automobile motors, but not to any extent. Probably the chief reason why more have not taken it up is because they do not regard it as having yet reached a stage where it can compete with the four-cycle, though a discussion of the various pros and cons is not possible here.

Many Readers Quick to Detect Error.

Editor THE AUTOMOBILE:

[616.]—I would like to ask what proof you can offer of the statement made in answer to question No. 585 that a vertical line represents a 45 per cent. grade? H. L. HORNING.

Waukesha, Wis.

Editor THE AUTOMOBILE:

[616A.]—On page 356 of your current number, in reply to letter No. 585, you say: "Bearing in mind the fact that a 45 per cent. grade" "represents a vertical line." Is this correct? Isn't a 100 per cent. grade exactly 45 degrees, and doesn't infinity per cent. grade represent a vertical line? I am of the impression that the steepest place in Eagle Rock Hill is about 17 per cent. and in Jacob's Ladder about 20 per cent. "GASOLINE SAL."

New York City.

Editor THE AUTOMOBILE:

[617.]—Referring to your answer to inquiry No. 585, I should be pleased to know how you arrive at the conclusion that a "45 per cent. grade represents a vertical line." We have always supposed that the number of feet rise per 100 feet horizontal distance gives the per cent. of a grade. That is, a 100 per cent. grade makes an angle of 45 degrees with the horizontal. Is this understanding correct? H. H. F.

Galion, O.

Editor THE AUTOMOBILE:

[618.]—I wish to correct a statement which you made in your answer to letter No. 585, issue of February 21. You say: "Bearing in mind the fact that a 45 per cent. grade is represented by a vertical line." This must have been a mistake, for a little further on in the same article you say a grade of 1 in 9 equals 10 per cent. or 11 per cent. nearly; following out this line of reasoning we come to a rise of 1 foot in 1 foot making 100 per cent. grade, and also makes an angle of 45 degrees with the horizontal. A vertical line represents a grade which is infinite, but is 90 per cent. to the horizontal. I have seen automobiles climb a 40 per cent. grade on smooth wooden boards for the grade. Jacob's Ladder, of which you speak, has an average grade of 25 per cent., but has a maximum of 31 per cent., which is quite a little in excess of your figures.

This subject of grades in per cents. and degrees seems to be pretty poorly understood by the automobile public, as well as the trade, and I would suggest your publishing in the near future the rough rules for computing the different gradients.

West Medford, Mass. EVERETT H. SHEPARD.

Editor THE AUTOMOBILE:

[619.]—Are you not mixed up in your statements about grades in your answer to question No. 585, issue of February 21? How can a 45 per cent. grade represent a vertical line? In steam railroad practice the grade of the track is usually described in feet per mile, but in street railroad practice, where much steeper grades are used, it is usually described in feet per hundred, or, what is the same thing, by a percentage. For instance, if a stretch of track 100 feet long is 2 feet higher at one end than at the other, its grade is called a 2 per cent. grade; and, in the same way, if the track rises 10 feet in running a distance of 100 feet, it would be a 10 per cent. grade. Now, on the above basis, a 50 per cent. grade would only be about one-quarter of the way to the vertical, a 100 per cent. grade just half way, and, if I remember my trigonometry, the grade percentage of a vertical line would be infinity.

I thought at first you might have confused the angle of the rise from the horizontal with the percentage of grade, but you evidently have not, for a 45 per cent. angle is only half way to the vertical, a right angle being 90 degrees, of course. I think I have

seen photographs of automobiles climbing wooden inclined planes at an angle of 45 degrees, and I am sure that when I took my runabout up an inclined plane to the second story of a paint shop the other day, we went up a grade that was at least 25 per cent., with plenty of power to spare.

If there is any misunderstanding as to what the percentage of a grade means, I think it important that you should have an article in your valuable paper on the subject.

Hartford, Conn. ARTHUR PERKINS.

The statement regarding grade percentages and the manner in which they are figured, to which the foregoing correspondents take exception, was an inadvertent error that was so palpably wrong that it is little wonder it has attracted so much attention. It should have been stated, of course, that a 45 degree angle represented a 100 per cent. grade, as was explained in the following issue of THE AUTOMOBILE. It is gratifying to note, however, how closely the inquiries and answers to correspondents are followed, as the paper scarcely had time to be in the hands of subscribers before letters were received taking exception to the above.

How to Find Horsepower Ratings.

Editor THE AUTOMOBILE:

[620.]—Will you kindly advise me how to find the power of two, four and six-cylinder automobile engines, and also what is the reason for the varying rating in the case of different makes. For example, take the Rambler four-cylinder car; it has a larger cylinder than the Maxwell four-cylinder, but a smaller power rating, namely 35 horsepower. GEORGE W. BARLOW.

Mahanoy City, Pa.

There is an endless number of formulæ for ascertaining the power of an engine, but there is no good reason to believe that any of them have superseded the old standard used for so many years in calculating the power of steam engines. This is expressed

$$\text{Horsepower} = \frac{P\,L\,A\,N}{33{,}000}$$

in which P equals the mean effective pressure throughout the working stroke in pounds per square inch, L the travel of the piston in linear feet, and A the area of the piston in square inches, while N represents the number of working strokes per minute. The only difference between this and the same formula as used for the steam engine is in the equivalent of N, which represents revolutions per minute in the latter case. From this you will see that there are a number of factors beside the size of the cylinder upon which the horsepower of the motor depends. The horsepower of a multicylinder motor may be ascertained most readily by finding the output of one cylinder and multiplying by the number used. It must be borne in mind that the mean effective pressure referred to does not mean the compression, though the latter, of course, has a strong bearing on it. It means the average pressure in pounds per square inch exerted on the head of the piston from the moment of ignition to the end of the stroke, and is generally calculated with the aid of a planimeter from indicator cards of the engine tested.

Engines Run by Inflammable Dust.

Editor THE AUTOMOBILE:

[621.]—In a foreign periodical I read the other day a reference to some experimental engine that was said to burn coal dust. No details of construction were given, and I am interested to know something of them. Is anything of the kind really practical, and just how does it work? I understand that the dust is burned inside of the cylinder, as is the case with the fuel of any internal-combustion engine. F. W. WALLACE.

Temple, Tex.

In Germany, a good deal of experimental and development work has been done along the line you suggest, and it is perhaps quite within the bounds of possibility that at some time in the future dust engines may be developed to a high degree of efficiency and serviceability. All there is to the idea is that of making an explosive mixture of air and of some impalpable fuel dust. It has long been known that such mixtures explode upon ignition. If there were any doubt upon this score, the common occurrence of dust explosions in coal mines and in flour and cotton mills would be conclusive. Apparently, any substance capable of being burned in the air will, if reduced to small enough particles and diffused throughout a mass of air, undergo upon ignition a rapid combustion that is practically explosive in character. Probably certain proportions of mixture are required, as in the case of liquid and gaseous fuels, but the only other conditions to be observed are those of having the diffusion equal and the fuel particles small enough. For a few cents you can buy at any drug store a quantity of lycopodium powder—the resinous spores of a sort of moss-like plant—which will flash like powder if thrown into the air and lit with a match, illustrating the principle involved in a very interesting manner. Of course, in making a really reliable engine to operate on this principle, there are a number of serious difficulties in the way. The abrasive effect of the fuel or its ashes is likely to cause serious scoring of cylinder walls, unless kept off or quickly removed from them, while the problem of infallibly securing properly-measured and compounded fuel charges is one that might well make the present-day carburetor problem seem simple. The best results so far secured have been with vertical, two-cycle engines, which possess the double advantage of keeping the fuel away from the walls as much as possible, while at the same time running the succession of charges through in a constant direction—in such a way that there is less chance of fouling than would exist with a four-cycle construction, in which the functioning involves to-and-fro travel of the gases. Attempts also have been made to stratify the charges, surrounding a central core of combustible mixture with wall-protecting zones of air.

Why Gasoline Motors Are Not Double-Acting.

Editor THE AUTOMOBILE:

[622.]—Will you kindly advise me why gasoline motors do not take their power from both ends of cylinder, same as steam engines; and why can they not be built the same as steam engines? BURTON D. GIBBS.

North Blandford, Mass.

Editor THE AUTOMOBILE:

[623.]—In the building of gasoline engines why are not the cylinders made in the same way as on the steam engine? That is, why is the impulse or active stroke confined to one side of the piston? Why should gas not be admitted on both sides of the piston so as to drive in both directions, as is done in the case of the steam engine? W. M. GEORGE.

Dexter, O.

The chief reason for not building gasoline engines of the double-acting type, as is done in the case of the steam engine, arises from the necessity of cooling the piston and piston rod and the attendant complication, when an explosion occurs on each side of the piston. It is not at all unusual to build double-acting gas engines, but their use is confined to stationary units and they are usually of comparatively large powers. The Standard 300-horsepower, six-cylinder marine motor is double-acting, as is the Nurnberg engine, a stationary type having two double-acting cylinders placed tandem.

A Doubtful Way of Improving a Car.

Editor THE AUTOMOBILE:

[624.]—I have a 1905 four-cylinder Autocar, and, as the tonneau is detachable, I expect to use it this season as a runabout, and my object in writing you is to find if reducing the wheelbase, which is 96 inches, to say 80 inches, by cutting off the rear end of the car and moving the rear axle forward, also cutting the driving shaft, would reduce the weight and increase the power enough to make the expense worth while?

The car is equipped with Hartford shock absorbers, so the shortening would not affect the riding qualities very much, and I would also remove a leaf from the rear springs.

Kindly let me know your ideas on the above.

New York City. RICHARD A. STREIT.

The changes you mention in your letter would undoubtedly lighten the car considerably, but whether they would be beneficial or not is quite another matter. Regardless of how much you shorten the car and its wheelbase, the power will not be in-

creased, though we presume, by this statement, you mean that the horsepower with regard to the weight will be greater than previously. If the car is not greatly underpowered, the removal of the tonneau alone should prove sufficient to make it as powerful and speedy as a car of its size can reasonably be expected to be. A wheelbase of 96 inches is not excessive for a runabout, and the work and expense involved in reducing it a matter of 16 inches would be a doubtful investment. We certainly should not recommend it on the score of improving the running or riding qualities of the car. If the rear springs prove too stiff, the expedient of removing a leaf might be tried, but it would be better to leave them as they are until experience has shown the necessity of a change. Making the alterations mentioned would also prevent ever using the chassis with the touring body again.

A Difficult Problem.

Editor THE AUTOMOBILE:

[625.]—Will you kindly tell me, through the columns of your paper, how much compression I want, how fast should I run my engine to get good results, and what size sprockets do I need? I have a single-cylinder, 4 3-4" x 6" planetary transmission, 28-inch wheels. The car weighs about 1,500 pounds.

Andover, Ohio. MYRLE SARGENT.

It is absolutely impossible for us to give an intelligent answer to your question, with the meager data you give as a line upon your requirements. You do not even say how fast you expect the car to run, which makes it utterly out of the question for anyone to attempt to supply satisfactory information concerning sprocket sizes, compression, etc. Upon receipt of fuller particulars we will be pleased to give you the desired information.

SUGGESTIONS FOR A PUZZLED SUBSCRIBER.

Editor THE AUTOMOBILE:

[626.]—An inquiry in your issue of January 10 has been called to my attention, and, as it is of an unusual character and it is possible that the right answer is still to come, I take the liberty of offering a suggestion at this late date. The item is headed "An Easy One, and Then a Hard One" (529), and is signed "A Subscriber," Bayside, N. Y.

Inquirer's motor is certainly behaving very queerly, and few "experts" would venture to say for sure why it works intermittently. The writer hopes, however, to at least start a line of investigation that will locate the guilty apparatus. I should first make sure the exhaust valves are not "hung up" to some extent, when a certain temperature is reached in each cylinder—one after the other quitting and staying out till temperature comes down.

Next, see that ignition spark mechanism is not so near its limit as to fail to spark inside of cylinder, as one by one their temperature and resistance become greater—such action as described being far more likely to occur in make-and-break ignition than with jump-spark. With former system the contacts are liable to stick and fail to operate at high temperature. With jump-spark the intervals of inaction would be very short, as internal temperature would fall rapidly after miss-firing. These details being found in order, I should then investigate the carbureter, and undertake to find out if the continuous, wide-open suction draws an excess of fuel into air passages, and eventually causes the miss-firing, cylinders quitting in the order of least ignition efficiency. The laying down of some cylinders of course results in a slowdown, and reduced fuel supply ratio, which soon restores the mixture, and allows other cylinders to resume operations.

It is likely that "Subscriber" will be able to readily prove out the suggestions above, but we will be pleased to suggest means of doing so if he makes written inquiry of us direct. We hope he finds the correct solution of the problem, and will appreciate the favor if he mails us a postal card informing us of the same.

THE R. E. HARDY CO.

New York City. By F. J. Watt.

PISTON VALVES STILL A PERTINENT TOPIC.

Editor THE AUTOMOBILE:

[627.]—In answer to Mr. Malcolm's reply to my letter, I always thought Mr. Malcolm to be deeply interested in the development of the two-cycle engine, and a man who has had considerable experience. But it is clearly seen by his prejudice against the piston valve that his experience in this line has been very limited, or conducted on a wrong principle. I think Mr. Malcolm would be able to see the advantage of this particular construction if he was not so influenced by his prejudice against the piston valve, and would probably think it worth while to start a discussion on the matter if his knowledge on the subject were a little broader. I would like very much to know if he ever constructed a two-cycle engine of any design that would throttle or run as slow as 100 revolutions per minute without missing. If so, where can it be seen in operation? Mr. Malcolm states that the only excuse for using the piston valve is for the purpose of locating it in a place of small cubic capacity in order to retain and keep the charge separated from the burned gases when the engine is throttled and running light. He also states that my construction will not permit of this. Now, where does he get his authority for making such a statement when he has seen neither one of my engines nor a working drawing? I would like to inform him that this is only one of my reasons for using check valves, and if he will give the principle a little study he will find several other advantages that cannot be accomplished in any other design.

These statements made by Mr. Malcolm are purely theoretical. Now for the actual facts from experience on my part. If the results mentioned by Mr. Malcolm as "being impossible in my engine" are not obtained in an engine that will throttle to 100 revolutions per minute running empty and slower when loaded, then they are not beneficial. I now have in operation, where anyone may see it, a four-cylinder two-cycle motor, built on the principle shown in my first article. Cylinder, 4-inch bore 3 1-2-inch stroke. Weight of complete engine, 200 pounds (no attempt being made at extreme lightness). Weight of flywheel, 25 pounds. This engine will throttle down to 100 revolutions per minute, empty, and continue to run at this speed any length of time without missing an explosion. It will respond instantly on opening the throttle. It will run as fast as 2,500 revolutions per minute without missing. This certainly contradicts Mr. Malcolm's statement that the valve would refuse to lift if engine were running very fast. This engine develops 30-horsepower at 1,200 revolutions per minute by Prony brake test.

Mr. Malcolm makes some very erratic statements in his letter replying to Mr. Miller. He says that the two-cycle engine has no positive means of introducing the fresh gas or expelling the burned gases. Now, if he will forget his prejudice long enough to give my sketch a little study, he will see that the charge is introduced just as positively as in a four-cycle engine, or more so if there is any difference. Now these gases being positively introduced will just as positively drive out the burned gases before it, and do it with less loss (and less mixing of the fresh gas with the burned), than in any engine introducing the fresh charge through ports and depending on the deflector to separate it from the burned. Mr. Malcolm's statements in his various articles as to the reliability of the two-cycle engine would be very conflicting to a person not having actual experience with these engines. What we want are actual facts.

At the end of my criticism of Mr. Malcolm's article he states through an editor's note that the error referred to by me was due to the draughtsman. Now, will Mr. Malcolm kindly explain how the condition so minutely described was to be obtained of having the spark plug extend down into the tube with the valve in any other position than that shown in his drawing? If he intended the valve to be in the position shown by sketch, where does the tube come in that surrounds the spark plug when the piston is at top of stroke? L. R. WOTTRING.

Prospect, O.

TESTING TO OVERCOME PITTING OF POINTS.

Editor THE AUTOMOBILE:

[628.]—I note in the issue of February 21, letter No. 584, and would advise Mr. Stark to have his coil tested with a Connecticut Coil Ammeter, and see how much current it is taking from his battery. The pitting points to large current consumption, and in most every coil I test this is the trouble. I have a four-cylinder coil here now, two coils of which will not work at less than 1 3-4 amperes, and they should work at not over 1-2 to 3-4 of an ampere, while the coils on my cars are set at 4-10 of an ampere and never give any trouble. E. F. BACHELLER.

Lynn, Mass.

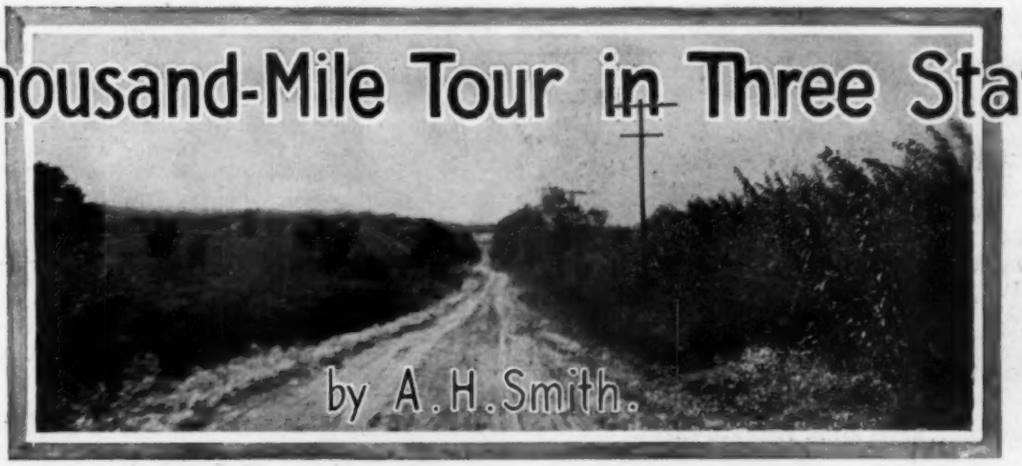
ANOTHER TO THE RESCUE OF NO. 582.

Editor THE AUTOMOBILE:

[629.]—In reference to your reply to Wenzel Bros. & Co., No. 582, will say that in the writer's opinion the cause of motor running unsteady is due either to a clogged gasoline supply to carbureter or a sticky float, and that the back-firing in carbureter is due to the mixture becoming too weak through lack of proper gasoline level in carbureter, and not on account of improper valve timing or pitted valve seats, as you suggest. What did No. 580 find to be the cause? W. H. RICKEY.

East Orange, N. J.

A Thousand-Mile Tour in Three States.



IN this particular Illinois home that evening the conversation had drifted to the ever-fascinating subject of touring—just as it so often does in thousands of other homes—and comment was made that within two years some sixty automobiles have come into use near Earlville, and that, like in other communities, as the home drives become familiar there follows the natural desire for touring. It is safe to say that no subject appeals more strongly to the average autoist to-day. Every owner of a car has unconsciously let his mind's eye wander to distant cities where reside relatives or friends at whose door he will sooner or later rap.

Following comment at home gatherings comes anticipation, and, soon, the genuine realization. Notice of our departure was so short that little opportunity was had for anticipating; in fact, our "road map" at the start was cut from a railroad time table picked up the last minute before waving handkerchiefs to friends and gliding swiftly away from Earlville, Ill., at 9:30 A. M., Wednesday, October 3, en route, as we supposed, to the State fair at Springfield, 170 miles to our southwest. We talked a little of extending the trip, but had hardly considered it seriously. However, the first day out settled it.

It was a clear October day, with rustling autumn leaves of every tint and hue, and the very atmosphere seemed to carry the regular pulsing throb of our motor to the beautiful wooded hills and to bring back the echo of "Come, come, come," as the car reeled off the miles past the constantly changing panorama of productive Illinois farms, the world's greatest corn belt.

At 10:40, Utica, at the base of the bluff in the Illinois river valley, was passed, and the river crossed by ferry boat, there being three spans of the bridge missing since a severe wind storm last Summer, when an unfortunate farmer and his team were drowned in crossing. For three passengers and our Cadillac the modest sum of 55 cents was charged, but the teams on the same boat paid less and took up more space. Very good dirt and gravel roads were found ahead, and we stopped at Wenona for dinner. The Illinois Central Railroad was followed from here almost due south.

Kappi was reached in the middle of the afternoon. Long live Kappi, and may it prosper, for we got lost in the ravines and made ineffectual attempts to ford the Mackinaw river, that looked dark and treacherous after a recent rain. For twenty miles down stream there was no bridge, but three miles up there was one, and now for a rougher country and winding roads and pretty scenery.

Shortly after 6 o'clock Bloomington was reached, and we registered at the Illinois. Here it was learned that the Bloomington

ON THE ROAD NEAR COLUMBUS, IND., AFTER PASSING A CARAVAN OF MIGRATING GYPSIES.

CROSSING ILLINOIS RIVER BY CABLE FERRY.

club had planned a road run of seventy miles to the State fair. We met Samuel Erwin, first vice-president of the Illinois State Automobile Association, and next morning at 9 o'clock took after his Buick, from which was scattered the confetti at every turn to guide the club members. Such a morning! Cloudy, foggy, and drizzling. Two miles out Mr. Erwin turned back, as no other club members ventured, and we hit the trail alone. Later members of the club went as far as Lincoln, telephoned to Springfield, found it raining there and turned back.

We took dinner at Lincoln, thence bore west and south to Fancy Prairie, where mud began to bother and things ahead looked like anything but a "fancy prairie." A crowd of good-natured loungers at the country store, headed by a joker named "Rube," asked questions and watched while gasoline was procured for a twenty-mile pull through mud, mud, mud, to Springfield, capital of the great State of Illinois, whose inhabitants would blush for such highways could they know of the hundreds of miles of really excellent hard roads our party were to encounter in sections of country less thrifty. There was just one redeeming feature about that twenty miles of mud, and that was the way our sturdy car slowly but surely plowed through it on low gear for three hours, past horses and buggies that tried to keep up. We had been advised for thirty miles to keep away from "sand hill," but conquered it at a steady pull, arriving in Springfield at 7 o'clock. Friday and most of Saturday were pleasantly spent in viewing the State fair and city, and in visiting friends.

Fascination of Touring Had a Grip.

But the fascination of touring had a grip on us, and late Saturday afternoon our car was headed for Decatur over rough but fairly good roads, and 7:30 P. M. found us looking for hotel accommodations there, made scarce by Sousa's band. This

PICTURESQUE STONE FARMHOUSE IN KENTUCKY.

fifty miles was marked by an exciting race with the electric cars. They would pass us only to be again passed at each station. Incidentally a large touring car joined in the race, but struck a bad place in the road that we luckily avoided, and stopped, and we saw them no more until overtaken in the outskirts of Decatur in stopping to light the tail lamp and display our "number," viz.: initials and address. Leaving Decatur at 7:35 A. M. Sunday, at Oakland a delay of three minutes was caused by the eccentric pushrod that operates the intake valve slipping from place, the only happening of the kind in our experience.

Paris was reached for Sunday dinner. The country thus far was fairly level, and roads fair to good, mostly dirt. Shortly after leaving Paris we started a sleepy old plug of a horse from his nap among the winding hills and he ran in the narrow road in front for two miles, and was so stirred up that he followed as long as we were in sight after passing him.

We Cross the Wabash at Terre Haute.

A hilly country and zigzag roads brought us to Terre Haute, Ind., across the Wabash, at 5 o'clock, where quarters were engaged at the Filbreck hotel. Inquiry as to a State license indicated that little attention is paid to the matter, and, perhaps, unwisely, we took the chance for Indiana and later for Kentucky. Monday morning from Terre Haute automobilists recommended the National road in a northeasterly direction to Indianapolis, a distance of ninety miles. Heavy traffic had damaged this road somewhat, though it was largely good, but very hilly in places. The worst hill was near Reelville, the steep winding kind, and, of course, a team was met right in the middle and a forced stop made, but immediately the car went on up with its load, which, with baggage, top, etc., equaled five passengers. Our car was a model "F," 10-41 gear, not specially geared for mountain climbing, but having all the power needed on the low gear, though at times more power on the high gear would have taken the hills faster. A speed of thirty miles an hour could be attained on the level. This car had already been run 9,000 miles in fourteen months by the writer in his business.

Orchards Were Plentiful.

Orchards innumerable were passed (and some were not), with apples being gathered in huge piles for market. As the summit of a hill was mounted, a teamster, who had fed his team of mules after slipping their bridles, was dozing. Talk about action! We will match him against the world for getting on his feet and bridling the nearest mule and hanging on with a desperate grip, though the mules only gazed in curiosity. No good opportunity presented itself for dinner until at Indianapolis late in the afternoon. As usual, gasoline, oil, and water were procured at a garage and the carbureter adjusted to the new gasoline. The car then headed southward. Boulevards were soon left behind, and the Madison State road taken fifty miles to Columbus, arriving early in the evening over highways that were a motorist's dream of pure joy.

Next morning Columbus was bade adieu early. Rain in the night had not spoiled the roads, which were good to Seymour and poor to Scottsburg, where at noon a rattling good dinner made up for it, as big a surprise as our appearance through such muddy roads. A few minutes was spent here in taking up the driving chain.

Hills Broadened and Valleys Deepened.

From Scottsburg the country began to change, the hills broadening and the valleys deepening. An electric line in process of construction was in sight more or less the entire afternoon, and darkies by the hundreds swarmed the grades and cuts, driving mule teams. More than once a warning hand stopped us while blasting was done with dynamite. Fertile spots of land would no more than get nicely started before rising to timbered hills which seemingly ended at the horizon in a maze of autumnal color beautiful to behold. The striking contrast of numerous

log houses, rail fences and often no fences, with here and there more pretentious homes, brought to our mind the thought that, after all, "there's no place like home" wherever you are.

Near Jeffersonville five cents toll was paid, and soon, with brake held firm and reverse ready for instant use, a steep hill ended abruptly on the bank of the muddy Ohio. Ferryboats alternate between here and Louisville, and 30 cents was the reasonable charge from Indiana to Kentucky soil. Withal it had been a pleasant ninety miles from Columbus, and called for sound, sweet sleep.

It Snowed in October in Kentucky.

Louisville autoists promised extremely hilly roads to Lexington, and, coming to a crossroads blacksmith shop a few miles out, it was decided to halt long enough to have the brake cable made doubly safe. It started to snow—think of it—the 10th of October, in Kentucky. However, the weather soon brightened, and, warmly clad, we were snug as could be with our heavy lap robes. While idly watching work on the brake cable, incidents of the trip were recalled. The ladies were invited into the house, and presently heard a spooky tapping on the door. With suppressed wonder they beheld a large tame goose admitted and fed biscuits from the hand of the housewife. No other food had ever tempted him.

Sign boards showing distance and direction will be great when they sooner or later come into general use. The average person questioned has no idea of distance, but usually makes a guess to oblige, and often you seem to get further away from a town, instead of closer to it.

Know Your Car to Enjoy Touring.

One thing about touring—know your car if you would get the full enjoyment of the trip each day by having that feeling of independence that makes responsibility a pleasure. It does away with garage bills and prevents being hung up on the road. Pay attention to detail and take nothing for granted, and, if you have anticipated by carrying possible necessities, a sane run will mean steady running.

With brake cable strengthened away we go again over Kentucky's famous hard roads, up one hill and down another, gliding safely and surely along through Shelbyville, and later into Frankfort, after a coast of half a mile from almost among the clouds into a picturesque valley, where nestled this pretty city, the capital. At 5 o'clock Lexington, the destination, was reached. Near Versailles had occurred the first puncture, 1905-06 Hartford-Dunlop tires of several thousand miles' prior use serving us well. Lexington and its race meeting of national fame were visited Thursday.

Then Came the Return Journey.

Friday morning, after putting in four new batteries and having the car washed, the return trip progressed over the same route, with unabated interest, to Indianapolis, Seymour being made the first day, a distance of 138 miles, where were met representatives of "The Automobile Official A. A. A. Blue Book." Saturday a glorious ride of 133 miles was enjoyed through Indianapolis and on to Logansport, 70 miles of the distance being straight ahead, without a turn, over the Michigan State road. Here a leak in a water pipe was stopped with tire tape.

Sunday the route taken was from Logansport to Momence, Ill., and as a new road map procured en route indicated no sandy counties, we struck some fifty miles of more or less low and high-gear mixed in irregular doses, not pleasant to take, but with a growing confidence in the single-cylinder Cadillac, if it were possible to increase that confidence. Only twice in these sand hills, when the driving wheels would spin, did the ladies get out, and then only because of a loyal sympathy for the sturdy car, which went through on its own power, no small feat when it is considered that residents there will tell you big touring cars with their added weight often bury themselves and have to be hauled out. Momence was reached at 7:30 o'clock, ninety miles, regardless of conditions.

DESERTED MILL ON THE VERMILION RIVER.

Monday morning found the country immediately changing to good old Illinois soil, and we rolled along through different towns to Morris, thence to Seneca and Marseilles, and back through Dayton to Earlville, where we arrived at 3:30 o'clock, after having been absent 12½ days, visiting 3 days, and covering more than 1,050 miles in the 9½ days' travel. Upwards of 175 towns were visited. One object of the trip was to ascertain from impartial sources what cars in their different classes were giving the best satisfaction in actual use.

Expenses of the Thousand-Mile Tour.

The expense of the tour is here given: Board and lodging, $53; sundries, $12.60; storing car nights, $6.25; washing car, $2; fifty-three gallons gasoline, $9.75; lubricating oil, $2.40, because of overcharging; batteries, $1.40; repairs, $1.60; total, $89.

RAILROAD MAGNATE TO HELP ROADMAKING.

Minneapolis, Minn., Mar. 4.—President James J. Hill, of the Great Northern railroad, has announced that his road will haul crushed stone free to any part of Minnesota to aid in the cause of good road building.

The good roads question is prominently before the Minnesota legislature now, owing to the introduction of a bill to authorize the employment of convict labor at stone-crushing and road building. The good roads people who advocate the passage of the bill have strong allies in the implement dealers of the State, who are fighting the passage of a bill authorizing the manufacture of farm implements by convict labor. The implement men have issued published statements, which have been circulated all over the State, urging the passage of the Elwell bill for convict labor on the roads.

DRIVING ABOUT THE ILLINOIS STATE FAIR GROUNDS.

CHARACTERISTICS OF VANADIUM STEELS

By J. KENT SMITH and W. L. TURNER.*

IT has been abundantly recorded that the element Vanadium, when judiciously applied in conjunction with other alloys, has very important effects upon steel in the way of largely increasing its static properties (strength and ductility) and, *what is of still greater importance*, of conferring to it extraordinary dynamic stress-resisting qualities such as have hitherto not been met with in other types of special steels. Up to the present, however, little or nothing has been done in this country with the manufacture of vanadium steels. However, a company in Pittsburg having successfully developed a mine rich in vanadiferous deposits in South America, is now undertaking the manufacture of this steel in quantity and of composition to suit requirements.

But Few Sources of Supply.

Before proceeding, it will be of interest to mention a few facts regarding this metal. Its separate existence was discovered about one hundred years ago. Chemists of the day alleged that this element, christened Erythonium, was being confused with the known element Chromium. It was re-discovered about thirty years after this and was re-christened with the name of Vanadium. Its chemical properties were little understood until Sir Henry Roscoe, after an exhaustive investigation of the element and its salts, finally isolated metallic vanadium for the first time.

Owing to the few known sources of supply, it was not considered that vanadium would ever attain more than academic importance, but recent discoveries altered this. The metal has an exceedingly high fusing point (2000° C.) and this alone would be sufficient to prohibit its use in steel manufacture; but from the fact that an alloy of iron containing 30 to 40 per cent. vanadium has a much lower fusing point than that of ordinary mild steel this objection to its commercial employment is removed, while high-class open-hearth steels can be produced by its aid at a reasonable price. Until recently the chief sources of vanadiferous ores of any importance have been:

1st—The vanadiferous lead ores of Spain.
2d—The ash of the Yauli anthracite deposits.
3d—The vanadiferous sandstones of Colorado.

Effect of Vanadium on Steel.

It has been proved that the most successful application of vanadium lies in the direction of quaternary steels, such as chrome, or nickel-vanadium steels. In order to obtain the best results with these elements, it is necessary to add the vanadium in homeopathic doses, with proper precautions, as it is a very powerful medicine and possesses to a very marked extent the property of "elusiveness." One of its most important effects on steel is its power of retarding the segregation of the carbides; examination under the microscope will most clearly exemplify this action and leads to the inference that vanadium steels should be particularly suitable for tempering, as is found by actual experiment to be the case. Being chemically similar to aluminum, vanadium also produces somewhat similar results in conferring soundness on the steels containing it. Further, vanadium appears to toughen the micro-constituent ferrite, and the latter in vanadium steels is shown to have a very closely interlocked granular formation.

Again, vanadium has been proved to be a powerful intensifier of the static action of other alloys. Now, it may be regarded as axiomatic that the employment of an alloy in such quantities as to largely increase the static strength of steel implies dynamic deterioration. Taking advantage of the intensifying action above alluded to, it is possible to obtain largely increased static effect with such a small proportion of the secondary alloy as not to bring about this dynamic deterioration. As vanadium itself possesses perhaps its most valuable property in its extraordinary powers of conferring to steel *added* dynamic excellence, combinations are possible which are absolutely unapproachable by any other means available at the present day.

Tests Not Sufficiently Comprehensive.

It has always been the custom to judge the quality or utility of a steel for all purposes by its behavior when subjected to a steady load. It has been the aim of the steel makers to show a high tensile figure, and a certain amount of static ductility at the same time. It has been argued that the standard of quality of steel for all purposes should be gauged by a combination of these two factors. Using the ordinary composition, it was, of course, found that, having exceeded a certain strength, the steel commences to become brittle in the sense that static ductility is being sacrificed. It was then discovered that by using certain other elements in addition considerable increase could be obtained in the tensile figures before any appearance of such brittleness was apparent. The fact that steel could bend cold through a certain angle was looked upon as an additional guarantee of its universal fitness. But no proof has been given of the assumption that a steel which is of the best quality for service under statically applied loads should also come out "on top" when employed in machinery where resistance to vibration and shock is of fundamental importance. It is difficult to see the reason for the continued adherence by manufacturers to the plain tensile test only, as a large proportion of the stresses applied are in the nature of shock and vibration; indeed, it has been calculated that in a high-speed engine between 80 and 90 per cent. of the total stresses are applied dynamically. The eventual result is that ordinary steel will become brittle when subjected to these repeated alterations of stress and will break down, notwithstanding the allowance of a large factor of safety. It has been proved that vanadium retards this deterioration under fatigue and alternating stresses, so that the "life" of the metal is greatly increased. Heat treatment, again, is of direct importance in the preparation of any steel.

Special Grades Being Marketed.

Vanadium steels have undoubtedly brought forth revolutionary possibilities in materials for employment in all machinery and moving parts. The enormous number of laboratory and actual working tests which have been made show their undoubted immense superiority over all other special types for resistance to stress, and this is of great importance in automobile work.

Below are a few of the types designed by the American Vanadium Company to most successfully withstand the specific conditions to which they are to be subjected:

(1) A type specially prepared for use in machinery in which shock, vibration, and alternating stresses occur, as in crankshafts, axles, piston rods, etc. This steel will withstand a severe shock, as well as a mild steel of only one-third its strength, will resist fatigue to a much greater extent than the highest qualities of ordinary mild steel, and has a wearing surface superior to any known non-brittle material, while its torsional elastic limit is very high.

(2) A type specially compounded to meet conditions requiring resistance to alternating stresses and shock in the highest possible degree. This steel has the static strength of good nickel forging steel, while dynamically it is enormously superior to the best mild Swedish steel. In connecting rods, piston rods, coupling rods, light axles and similar work, practical difficulties have been overcome by its aid which have been regarded as insurmountable.

(3) A type designed to resist torsional destruction to a maximum degree, and at the same time to have a comparatively high elastic limit and resistance to shock. Wonderful results have been obtained in practice with this type in holding down bolts and hydraulic machinery.

(4) A type suitable for the construction of springs of all kinds, both for heavy and light loads. This steel in the raw state may be bent and knotted cold, but when heated and quenched will become hard enough to cut glass. Its coefficient of safe working load when tempered is double that of the ordinary carbon spring steel. Its vitality being extraordinarily high, springs in "difficult" places, subject to frequent overload especially, should be made from this steel.

(5) A type eminently adapted for all case-hardening operations. A case may be obtained so hard that it can only be indented by grinding, while at the same time a very tough core is obtained having similar tensile figures to type No. 1 above.

(6) A type of pure low carbon Vanadium steel which is, in its special properties for withstanding vibration, superior to the best wrought iron obtainable, while it welds with the freedom of that wrought iron.

*Chief Metallurgist and Associate Engineer of the American Vanadium Company, Pittsburg.

CLUB NEWS WAFTED IN BY MARCH WINDS

New Jersey Autoists' Endurance Run May 30-June 1.

NEWARK, N. J., March 4.—May 30, May 31 and June 1 are the days defininitely fixed for the spring endurance contest of the New Jersey Automobile and Motor Club. It is thought by fixing upon this date to obtain the entry of a large number of club members who could not ordinarily spare three days from their business. May 30 being Memorial Day is, of course, a legal holiday, while Saturday, June 1, will be a half-holiday. Definite arrangements as to the route have not yet been made, but it is expected that the distance will be 350 to 400 miles and that a start will be made from Newark. From this point the run will probably be to Dover via Montclair, Pompton, Butler, Denville and Rockaway. At Butler there will be a control, and at Dover the contestants will stop to lunch. From Dover the run will continue over Mine Hill, through Kenville, Mt. Carmel, and Mt. Freedom to Morristown, where another control will probably be placed. From Morristown the route will lead back to Newark by the regular way through Madison and Chatham. On Friday morning the competing cars will journey from Newark through Rahway to New Brunswick, where the first control will probably be placed; thence to Trenton by way of Hightstown. At Trenton will be another control. It is uncertain what route will be taken from Trenton to Atlantic City, but Camden will probably be avoided and the better route taken passing outside the city. Starting from Atlantic City on Saturday morning, the machines will pass through Pleasantville, Absecon, Port Republic, Tuckertown, Barnegat, Forked River and Toms River, to Lakewood. From this point back to Newark the route is somewhat uncertain and a sub-committee has been appointed to work out details.

At the outset it had been intended to make the competition merely a test of staying power of the competing machines. When the ground was gone over, however, it was found impossible to run the tour on this basis.

Keeping it within the State of New Jersey took the machines over such good roads that a dozen cars might traverse the whole distance without incurring a single penalty. It thus became necessary to introduce some other restrictions, and the only one that seemed practicable was economy of fuel consumption. It is not yet definitely settled that the economy feature will be adopted, but the chairman and other members are of the opinion that it will bring about the best results. One point which will be insisted upon is that the machines shall absolutely adhere to the twenty miles and hour State law. Any car exceeding this limit will be penalized. Under practically all circumstances the machines must be kept running, by which regulation is meant not merely that the motor must be kept going, but that the car itself must not be stopped. The only stoppage allowed for is when a restive horse is met, the driver of which signifies that the car must stop as allowed by law. It is intended to make the competition of such a searching nature that it will be almost impossible for more than one or two machines to come through with a clean score.

Two classes will be provided for, one for touring cars, the other for runabouts. The touring car trophy will consist of a cup donated by W. C. and B. M. Shanley, Jr., while the New Jersey Club will offer a cup for the runabouts. Each automobile must carry the full number of passengers advertised by the manufacturer as capable of being seated in the car. Secretary H. A. Bonnell is chairman of the committee in charge of the arrangements.

Rockford Club Elects Officers for Coming Year.

ROCKFORD, ILL., March 1.—After a spirited contest at the annual meeting, the following officers were elected for the ensuing year: La Verne Cole, president; James Rogers, vice-president; Horace Havens, secretary; Dwight Cutler, treasurer. S. C. Andrus was chosen director to succeed Dwight Cutler.

Minnesota State Body Organized for the A. A. A.

MINNEAPOLIS, MINN., March 4.—The organization of the Minnesota State Automobile Association has just been perfected, the first object of the association being to protect automobilists against drastic anti-automobile legislation now pending in the Minnesota Legislature. Four clubs joined the association on its formation, the Minneapolis Automobile Club, St. Paul Automobile Club, Duluth Automobile Club, and Mankato Automobile Club.

The officers of the association are: President, Frank M. Joyce, Minneapolis; vice-president, George M. Palmer, Mankato; secretary-treasurer, H. S. Johnson, St. Paul; directors, H. H. Myers, Duluth; G. A. Lewis, Mankato; Dr. C. E. Dutton and G. A. Will, Minneapolis; Oliver Crosby and T. W. Ingersoll, St. Paul. A committee on legislation was appointed, consisting of Dr. C. H. Kohler and Col. Joyce, Minneapolis; H. H. Myers, Duluth; George C. Knocke and L. A. Wood, St. Paul.

The officers of the club and members of the board of directors and legislative committee include the most prominent men in the automobile and good roads associations of the State. A hearing has been arranged by the House committee, before which the automobile bills now lie, and members of the State association will appear before the committee within a few days. It is planned to push good roads work vigorously through the medium of the State association. Preliminary work has been done on a highway from Minneapolis and St. Paul to Duluth, and the association will push this 150-mile road with vigor. The members of the clubs comprising the State association are practically agreed upon remedial legislation necessary for the welfare of the State and the automobilists, and will have recommendations and amendments ready for submission to the legislative committees.

Discussion was also started looking toward a day of racing at the State Fair this year. A committee appointed to investigate this matter includes S. N. Colburn and Asa Paine, who presided over the Ormond-Daytona races this year; L. A. Wood and Theodore Griggs, St. Paul, and R. E. Brown, Mankato.

Quaker City Club Appoints Its Committees.

PHILADELPHIA, March 4.—Spurred on by the spring-like weather of the latter part of the week, President Swain of the Quaker City Motor Club on Saturday last announced the committees which will serve during the next year. The delay in the announcement was due to the president's desire to appoint no one who could not actively work on the committee to which he was assigned. As a result, quite a number of changes had to be made before the list could be finally completed. Following is a list of the committee chairmen: Membership, A. T. Stewart; house, Nathaniel Hathaway; contest, E. C. Johnson; press, E. H. Fitch; auditing, L. D. Berger; law and ordinances, G. Douglas Bartlett; good roads, A. E. Maltby.

At the regular monthly meeting next Thursday, Chairman Johnson of the contest committee will announce the program for the season.

Successful Banquet of the Staten Islanders.

ST. GEORGE, S. I., March 2.—The Richmond County Automobile Club held its annual banquet to-night at Hugot's Hotel, sixty members sitting down to the elaborate spread. President Charles A. Schultz made a witty and versatile toastmaster. The speakers included A. R. Pardington, vice-president and general manager of the Long Island Motor Parkway, and when he had concluded his optimistic remarks about the special road for automobiles, the Staten Islanders were in a mood to engage him to begin work on a similar highway as soon as his Long Island task is completed.

Other speakers included H. E. Buel, superintendent of high-

ways of the Borough of Richmond; Henry P. Morrison, county engineer before the consolidation, and T. F. Moore, of the New York Motor Club.

The most pleasing feature of the evening was the presentation of a handsome loving cup to J. J. Worrell, the hard-working secretary of the organization. William S. Van Clief, president of the Richmond County Agricultural Society, made the presentation speech, to which the recipient of the cup responded in a happy and appreciative vein.

Plans of the New York Motor Club.

NEW YORK, March 4.—At the recent meeting of the directors of the New York Motor Club, with President S. B. Stevens presiding, it was decided to hold a club smoker on the evening of March 15. Preceding the vaudeville part of the program, there will be a six vs. four-cylinder discussion, in which have been invited to participate representatives of leading makers. It is expected that a formidable array of speakers will be secured for both sides of the discussion, which will be followed by high-grade vaudeville features and refreshments. It is among the possibilities that the club will soon be located in larger and more commodious quarters, there being some talk of renting an entire house near the Broadway automobile district.

In the form of an advisory committee to the board of directors the following were designated: A. R. Pardington, S. A. Miles, Alfred Reeves, C. B. Rice, John Kane Mills, George McKesson Brown and T. F. Moore. These will be added to the board as soon as the necessary constitutional changes can be effected. A. B. Tucker has tendered his resignation as secretary.

Tacoma Automobilists Active for Good Roads.

TACOMA, WASH., Feb. 28.—At the annual meeting of the Tacoma Automobile Club a special committee was appointed to raise $5,000 to aid in the paving of Center street, which illustrates that the club members are willing to pay for what they think will be of public benefit. The main idea of the club is to get concerted action on such schemes as are necessary for the proper pleasure of autoists. The ultimate aim is to have a club which will be somewhat social in character and which will have regularly appointed runs; but at present the organization is working for better roads in the city and adjoining country and for permission to enter the Government reservation at Paradise Valley.

Under existing conditions automobiles are not allowed within the national park there. The reason for this is not known. The Tacoma Automobile Club, through Congressman F. W. Cushman, is attempting to have this regulation repealed, and if successful will devote a part of its efforts to building a road from Tacoma to connect with the Government road being built on the reservation. If, however, the Government refuses to give the required permission, the club will gain no good from helping to have the road built, and, in all probability, the scheme will be dropped.

The following officers were elected for the current year: President, Chester Thorne; vice-president, Richard Vaeth; secretary, H. H. Gove; treasurer, Fordyce Taber; trustees, John F. Lyon, J. C. Donnelly, and Calvin Phillips.

Long Island A. C. May Rejoin the A. A. A.

BROOKLYN, N. Y., March 5.—Growing sentiment in favor of a renewal of the membership of the Long Island Automobile Club in the American Automobile Association is taking a pronounced form, and an early return to affiliation with the national organization is predicted by the knowing ones. In withdrawing from the A. A. A. the Long Island Automobile Club was criticized. The action of the local club was construed by some to mean that it wished to take no more active part in furthering the cause of the autoist. This is far from the case. It would be hard to find a member who is not intensely interested in every move made to help along the man who wants to use the automobile. The local organization felt that it was not receiving an adequate return for the money which was paid as dues to the national body. Since last year the American Automobile Association has undergone a change which, in brief, leaves to the different State associations affiliated with it the bulk of the work of guiding legislation, promoting the cause of good roads and other moves calculated to be of benefit. Seventy-five per cent. of the dues now paid go into the treasury of the State bodies, the other 25 per cent. only passing into the national treasury.

The Long Island Automobile Club has always been a believer in the great good to be derived by pooling interests in the united action made possible by a State body. Many of the members believe, however, the time is now ripe to again join hands with the men who are pledged to protect and further the interests of the automobilist in every way possible.

Harrisburg's Motor Club is Organized.

HARRISBURG, PA., March 4.—Local automobilists and motor boat enthusiasts have organized the Motor Club of Harrisburg and have elected former Mayor Vance C. McCormick, president. The other officers are: First vice-president, Oscar C. Robertson; second vice-president, R. R. Buvinger; third vice-president, Charles C. Cumbler; secretary, J. Sidney Sible; treasurer, John C. Nissley. The board of governors consists of Dr. John Oenslager, Herbert F. Rawll, C. G. Nissley, James A. Bell, James McCormick, Jr., Roy Senseman, A. Stees, Frederick D. Carney and Howard Jenkins. The following chairmen have been appointed to head the special committees: Membership, R. A. Sefton; house, I. W. Dill; exhibitions and runs, R. C. Haldeman; laws and ordinances, D. C. Haldeman; auditing, H. C. Wright; roads, J. C. Nissley.

One of the first steps to be taken by the new organization will be to secure better roads in the vicinity of this city. The roads leading into the Capital City are in terrible condition at the present time owing to the refusal of the supervisors to apply for State funds. The exhibition and run committee is arranging for a two-day endurance run during the latter part of April which will include Lebanon, Lancaster, Columbia, York, Hanover, Gettysburg, Chambersburg and Carlisle in the itinerary. An automobile parade and other contests are planned for the summer. The club has a charter membership of 130 of the most prominent business and professional men in the city.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows.

March 9-16.....—Boston Automobile and Power Boat Show, Mechanics' Hall and Horticultural Hall, Boston, Automobile Dealers' Association. C. I. Campbell, mgr.

March 13-16....—Omaha, Auditorium, Second Annual Automobile Show, Omaha Dealers' Association. T. Gilman, manager.

March 18-23....—Providence (R. I.) Automobile and Power Boat Show, Infantry Hall. F. M. Prescott, manager.

March 21-30....—New Haven, Conn., Second Regiment Armory, Automobile Show, under the auspices of the local dealers.

April 1-6.....—St. Louis, Mo., Automobile Show, Jai Alai Building, St. Louis Automobile Dealers' Association.

April 6-13.....—Montreal, Canada, Second International Automobile and Sportsman's Exhibition. R. M. Jaffray, manager, 309 W. Notre Dame street.

April 8-13.....—Pittsburg, Pa., First Annual Show of the Pittsburg Automobile Dealers' Association, Duquesne Garden.

Races, Hill-Climbs, etc.

April 1.....—St. Louis, Mo., Auto Floral Parade, Automobile Club of St. Louis.

April 8-9.....—Harrisburg, Pa., Two-day Endurance Run, Motor Club of Harrisburg.

May 30.....—Philadelphia, Hill Climb, Quaker City Motor Club.

May 30 June 1..—Newark, N. J., Endurance Run, New Jersey Automobile and Motor Club.

Oct. 19.....—St. Louis, Mo., International Aerial Race for the Gordon Bennett Prize. Aero Club of America.

WIDESPREAD INTEREST IN A. A. A. ANNUAL TOUR

THE exact route and the rules for the Glidden and other trophy contests involved in the annual tour of the American Automobile Association may not be announced for a week or more, despite the fact that the Touring Board held a meeting at Buffalo, March 1, and formally organized by selecting sub-committees, the chairmen of which compose the Executive Committee, the head of which, of course, is Frank B. Hower, the chairman of the entire board. James B. Dill, East Orange, N. J., is chairman of the Touring Information Committee; L. E. Myers, Chicago, of the Foreign Touring Committee, and Philip S. Flinn, Pittsburg, of the Road Signs Committee. Dai H. Lewis, Buffalo, is to serve as the special secretary of the Touring Board.

Judge Dill's sub-committee has twenty-six members, and its duty will be to assist in the accumulation of all kinds of touring information, which shall be kept by the secretary of the A. A. A. for the benefit of all members. In like manner the committee of twenty-seven, headed by Mr. Myers, will obtain foreign material. Mr. Flinn's road signs work will include the formulating of plans to bring about the marking of the trunk roads of the country, either through the aid of local laws and authorities or by co-operation of State associations and clubs.

The Buffalo meeting agreed upon several necessary changes in the deed of gift for the Glidden trophy, and Mr. Glidden will be asked to assent. The most important change is one suggested by the Automobile Club of Buffalo. Percy Pierce, winner of the trophy in 1905, and retaining same for the Buffalo Club through tieing with the other clean-score participants in the 1906 tour, was a factor in advancing the change which would prevent the Buffalo organization keeping the trophy in case of another tie. In this event the trophy might go to the club which supplied the most survivors, but it is understood that the desire of the Touring Board as a whole is that the 1907 contest shall be of such a strenuous character that the possibility of ties will be greatly reduced.

The Executive Committee of the board had a conference on Wednesday of this week with the Contest Committee of the National Association of Automobile Manufacturers, which some time ago had in mind the running of a series of contests for stock cars, but recently came to a decision that amounts to the giving up of the idea. As a result of the conference between the A. A. A. officials and the N. A. A. M. representatives, something definite may be expected in the near future. It may be that there will be a conference involving the N. A. A. M., A. L. A. M. and A. M. C. M. A. and the Executive Committee before all the details are decided upon.

As to the route, there are those who advocate a start in the West and a finish in the East; those who hold to the contrary and want the start in the East and the finish in the West; with a third element asking for a start in the East and a turning point in the West and the finish in some Eastern city other than the starting point. Unquestionably there is keen interest in the affair, and the entry list promises to be substantial, no matter what route is chosen.

The Hotchkiss Administration is Making Great Headway.

On the heels of the report of the formation of a Minnesota State Association of the A. A. A., containing four clubs and over 800 members, comes two conferences this week that may bring about two more State bodies. Last night at Philadelphia there was a conference of President W. H. Hotchkiss and other members of the Executive Committee with President Isaac Starr, First Vice-President Robert P. Hooper, and Secretary Paul C. Wolff, of the Pennsylvania Motor Federation, which possesses fifteen clubs and has upwards of 1,500 members. To-night, at Bridgeport, Conn., there will be a conference with representatives of several Connecticut clubs. A Connecticut body is practically assured, and it will probably start out with the Hartford, New Britain and Bridgeport clubs as the nucleus.

Secretary F. H. Elliott will take a trip through the Middle West next week to attend meetings in Michigan, Indiana and Kentucky, in all of which States organization work is already under way. Tentative organizations have been formed recently in Wisconsin and Missouri, and from present indications there will be six or eight applicants for State membership at the March meeting of the A. A. A. Board of Directors, which will take place the latter part of the month.

FEDERAL BILL OF THE A. A. A. IS NOW UP FOR DISCUSSION

A START has been made by the American Automobile Association in the direction of national legislation concerning automobiles. Chairman Chas. T. Terry of the legislative board last week went to Washington and had introduced through Representative Cocks of New York a bill entitled "An Act Providing for the Regulation, Identification and Registration of Motor Vehicles Engaged in Interstate Travel." It was not expected that action could be obtained at the session of Congress which has just closed, but it is anticipated at the forthcoming Congress of next December that the measure, which was referred to the Committee on Judiciary, will receive early attention, and automobilists who have examined its provisions are confident that it will be declared constitutional if it becomes a law. The main features of the measure are as follows:

(1) Exemption from registration provisions of State laws other than the laws of the State of the owner's residence. Thus: On compliance with the provisions of the act with reference to previous registration in the State of the residence of the applicant, and on filing with the bureau created by the act of a verified application, which application shall state among other things the name and residence of the applicant, his State registration number, a description of the vehicle, the manufacturer's number, the character of the motor power and the amount of such power stated in figures of horsepower, such bureau shall issue to the applicant a certificate of registration and a federal number. Thereafter in traveling anywhere in the United States outside of the State of the owner's residence, such owner shall, by displaying the federal number on the front and rear of his motor vehicle, be exempt from the laws of other States regulating registration and the carrying of numbers.

(2) The identification number or sign.—The provisions of the act require that while the vehicle is in a foreign State, such number shall always be displayed both in front and in rear; the number to be three inches high, with the initial letter or abbreviated designation of the State where the vehicle was originally registered at the left of such number and the initials of the United States at the right of such number.

(3) The Motor Vehicle Bureau: The act will create in the Department of Commerce and Labor a bureau in charge of a commissioner with a secretary and clerical assistant. To such bureau will be sent all applications, and in it will be kept records of the vehicles registered, indexed for ready reference and the supplying of information on all proper requisitions for the same. Salaries are provided for the commissioner, secretary and clerical force, payable out of the fund created by the registration fees. Such fee will be $5 in the case of an individual and $10 in the case of a manufacturer.

"The Congressmen who studied the provisions of the bill," said Mr. Terry after returning from Washington, "seemed highly pleased with it. They all expressed their satisfaction that the bill was presented at this time because it will offer ample opportunity before the next Congress for its provisions to be thoroughly discussed, and any amendments or additions that might be necessary will be in readiness for discussion as soon as the bill comes properly before the House. I may be enthusiastic, but I sincerely hope and expect to see the bill a law within a year at least, probably less. It will become a law 30 days after being signed."

THE AUTOMOBILE

Vol. XVI Thursday, March 7, 1907 No. 10

THE CLASS JOURNAL COMPANY,
Flatiron Building, Madison Square
New York City

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To Subscribers—Do not send money by ordinary mail. Remit by Draft Post-office or Express Money Order, or Register your letter.

FOREIGN SUBSCRIPTION AGENTS:

ENGLAND:—Iliffe & Sons, Limited, 20, Tudor Street, London, E. C.
FRANCE:—Boyveau & Chevillet, 22 Rue de la Banque, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly).

Copies printed	in 1905,	730,000
" "	in 1906,	791,000
" "	This Issue,	18,000
" "	Since January 1,	172,400

The Road Question Is Up to the Automobilist. "If I read aright the signs of the times, the hour has come for the automobile interests to take up the road question as their question." Thus writes James W. Abbott, a prominent ex-commissioner of the Office of Public Road Inquiries, and a man who has argued and talked for good roads these many years. Mr. Abbott's very able comments will be read with keen interest, and his opinion should carry the weight of an authority whose observation has been unbiased except to the extent of working for that which he believes to be for the general good of the entire country in the establishment of a road system which will compare with the ideal kind of the far-seeing French.

Mr. Abbott believes that the automobile has captured the farmer, and he predicts that the country nabob will soon plow, plant, sow, and till his fields and gather his harvests with motor devices. Mr. Abbott suggests, as he did several years ago, that the automobile, carriage, farm vehicle, street paving, brick making, and other industries should be represented in a national organization, the existence of which should be for the building of good roads. It might be noted that of all these interests he now places the automobile first, and the reason for so doing is becoming plainly more apparent every day.

In the future building of these roads there may come the necessity of a radical change in the present method of construction, for it cannot be denied that the coming of the automobile is exacting from our roadways a mileage many times greater than has been called for by the horse-drawn vehicle.

Advance in Metallurgy Due to the Automobile. Apart from the fact that the automobile as typified by the gasoline type of car, with its internal combustion motor and sliding gear speed changes as an essential link in the transmission of the power, is proving an unqualified success despite the voluminous predictions of some years ago to the contrary, nothing has served to emphasize the position it now occupies so much as the advances in the art of metallurgy for which it has been responsible. Considered as a piece of machinery, the automobile costs more per pound than any similar piece of mechanism manufactured, and this, it is averred, is the reason why its makers have been able and willing to pay prices far beyond the reach of makers of other classes of machinery.

Strength, combined with lightness to a degree never before found necessary, had to be attained at any cost, and the result has been an impetus to the art of alloying steels, such as it could not have received from a quarter of a century of development in the ordinary course of events. The 12 and 15-horsepower cars of several years ago were already beyond the economic weight limit, both where tires and other considerations were concerned, so that a reduction of the weight was as imperative as an increase in power; but one could not be brought about without the other. The limit of development seemed to have been already reached in the case of carbon steels, so that the matter of alloying, supplemented by scientific heat treatment, was taken up and has been carried to an unprecedented degree.

To appreciate what has been accomplished, it is necessary to consider the modern automobile: carbon steels have given way to nickel-steel, and the latter, in turn, to chrome-nickel-steel, both having been brought to an unprecedented degree of improvement through the great amount of study devoted to the subject. And now we are to have vanadium steels—which from the rarity of the alloying component have hitherto been considered unduly expensive even for the automobile, though used to a limited extent on automobiles constructed abroad.

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Further Progress in Alcohol Legislation. Though loth to accede to the popular demand for legislation along this line, as was demonstrated by the number of years required to pass the Free Alcohol bill of last year, Congress having taken the first step, is evidently not going to be allowed to stop half way, as is shown by the action of the Senate during the past week. What this means to the automobilist will doubtless take several years of development to demonstrate, but that it will result in the ultimate good, not alone of one class of liquid fuel users, but of many, cannot be gainsaid. It has been claimed all along, that the bulk of the gasoline used to-day is consumed by the farmer in small stationary engines and in cooking stoves, and this being a fact, the granting of the right of the agriculturist to make his own fuel should certainly tend to relieve the situation to a great extent, though relief may be slow in coming.

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The U. S. A. as a Market for British Cars. Every Englishman connected with the industry who has come to this country, whether for a stay of a week or three months, has been visibly impressed with the great number of automobiles in use and the wretchedness of the roads their owners have to put up with, and has hardly been able to contain himself until he could get back home to tell his confrères about it. He pictures to himself a vast field for the British automobile to conquer and sets about to enthuse British makers in the propaganda of exports to America, citing the success of Continental makers to witness the golden harvest that awaits the reaper. The Hon. C. S. Rolls proved no exception to the rule. It would appear superfluous to call attention to the fact that more American automobiles are sent to Great Britain every month than there are British cars in this country all told, and the number of the latter does not grow in a manner at all indicative of a promising future.

WHAT FRELINGHUYSEN NOW SUGGESTS.

TRENTON, N. J., March 4.—Senator Frelinghuysen has somewhat modified his ideas, according to the bill which he has introduced in the New Jersey Legislature. It provides for the registration of cars and licensing of drivers, fixes rules regulating the use and speed of such vehicles, fixes license and registration fees and provides penalties, authorizes the Secretary of State to appoint twenty-five inspectors at $3 a day each, and as many private citizens to act as special inspectors, gives State Commissioner of Motor Vehicles $1,500 a year, in addition to his salary as Assistant Secretary of State, gives the chief inspector the same salary, provides for three days' license for tourists at $1 each, and calls for persons residing outside the State to file address of counsel upon whom service may be made in case of accidents in this State.

It will be noted that there is no reciprocal registration clause, but $1 a day is asked for what is designated as a tourist's license. It was stated that Senator Frelinghuysen had given assurances to several prominent New York automobilists that his new bill would include reciprocal registration.

AMENDED DENATURED ALCOHOL BILL PASSED.

WASHINGTON, D. C., March 2.—After a lengthy debate the Senate passed the House bill amending the denatured alcohol act, and it is now in the hands of President Roosevelt, awaiting his signature becoming a law. The object of the bill is to relax the Government inspection to permit the manufacture of alcohol for denaturing uses in small quantities along the lines of the German law. The new act is intended to satisfy the complaints of Western farmers, who claim that the original free alcohol law passed last year was so framed as to deny them the benefits which the legislation as originally planned was designed to confer.

An amendment submitted by the Finance Committee came near wrecking the bill. The object of this amendment was to require a Government storekeeper to be present during the entire period of distillation of spirits. It was pointed out that this would involve so much expense as to make the operation of the law impracticable in its relation to small distillers in agricultural communities. The amendment was lost, and then the bill was passed.

GOLD CUP TOURISTS WILL SAIL JUNE 20.

American autoists engaged in the 4,000 miles' tour through Europe for the American Gold Cup will leave New York June 20 on the *Provence*. The machines will be sent in advance on the French liner *St. Laurent*, sailing from New York June 7. Immediately on arriving at Havre the caravan will proceed to the Dieppe district to witness the Grand Prix race of the Automobile Club of France, after which they will begin their six weeks' run through the different countries of Europe. The entries already received for the tour include the Welsh, Thomas, Pierce, Cadillac, Packard, Stearns, Moore, B. L. M., and Columbia. Individual entries have been booked from Vancouver, Alberta, B. C., and Fort de France, Martinique. The entry list will close on May 15.

FOURNIER'S OFFER TO THE GOLD CUP TOUR.

Henry Fournier, well known in this country because of frequent visits here in years past, and now the manager of Paris-Automobile, 48 Rue d'Anjou, comes forward with the generous offer of providing free storage for the American cars which participate in the European tour being promoted under the direction of Georges Dupuy, now of New York City, but formerly of Paris. Mr. Fournier is the manager of one of the largest garages in Paris, possessing a capacity of 400 cars, and its location is decidedly convenient, being in the very central part of Paris. A special part of the garage, or a floor quite closed, will be provided for the American cars during their visit to Paris.

FORD HAS THE MOTOR TRACTOR IN MIND.

DETROIT, March 3.—Henry Ford has returned from a six weeks' vacation in California and Southern points. The rest was the first Mr. Ford has taken in six years. While in the West Mr. Ford looked thoroughly into the possibilities of motor traction, a phase of the motor industry that he has made a pet of the past few years, though he has said little on the matter.

"There are vast possibilities for motor traction in the West," said Mr. Ford, "were it possible to secure fuel at a reasonable rate. At the current price of gasoline, however, the outlook is none too bright, and there is no telling how far the price of gasoline will advance. Steam is used considerably, and giant ploughs that turn forty furrows at once are used in some cases on the plains. With fuel practicable at half the present cost, the motor traction phase of the industry would be practically unlimited.

For the present Mr. Ford will devote most of his attention to the construction of the six-cylinder racing machine that the company will send after the Vanderbilt cup this year. The plans are all ready and work will be commenced immediately. It is expected that the racer will be ready for the road in April. It is understood that the car will be turned over to Kulick, the well known driver, who will tone it up and probably drive it in the elimination. As the Wayne people also have just announced that they intend to enter a car in the Vanderbilt race this season, interest in this great classic will run high in Detroit. The Ford racer will be constructed of Vanadium chrome steel.

TWIN CITIES WANT A. A. A. TOUR START.

MINNEAPOLIS, MINN., March 4.—Minnesota is the latest claimant for the A. A. A. tour of 1907. The Minnesota State Automobile Association, recently formed, will urge the starting of the tour from Minneapolis and St. Paul, or from Duluth, if the Tri-City highway to the Head of Lakes can be completed in time. The Chicago-Twin City endurance run of 1905 furnished a substantial test of cars, although bad weather made the run unsuccessful in some of its features.

MISSOURI'S PROBABLE NEW AUTO LAW.

JEFFERSON CITY, Mo., March 4.—The Botsford automobile bill, requiring a State license costing $5 and permitting the operation of an automobile anywhere in the State, was passed by the House to-day by a vote of 98 to 5. It is expected that the Senate will take similar action. The present law permits each county to require a license, and there has been no end of inconvenience.

WEBER BILL RECOMMITTED FOR A HEARING.

ALBANY, N. Y., March 5.—The Weber bill, which would require non-resident automobilists to take out New York State registration, was to-day recommitted to the General Laws Committee of the Assembly for a hearing. The impression prevails that the bill will never become a law, unless it is urged by the New York State Automobile Association, which at present is antagonistic to the measure.

N.A.A.M. DOES NOT DESIRE ASSOCIATE MEMBERS.

Associate members of the National Association of Automobile Manufacturers have received a communication from the Executive Committee, stating that it is the desire to abolish the associate membership and make the organization one of active members exclusively. It is stated that the manufacturers of automobiles feel that the association can render no service whatever to associate members. Therefore resignations are being solicited.

CHAIRMAN HOOPER, TO REPRESENT PENN.

Robert P. Hooper, Chairman of the A. A. A. Good Roads Board, has been appointed by Governor Stuart, of Pennsylvania, to represent that State in the annual convention of the American Road Makers' Association, at Pittsburg, March 12-14.

THE POSTER OF THE AMERICAN MOTOR CAR MANUFACTURERS' ASSOCIATION.

This poster is being distributed by the American Motor Car Manufacturers' Association, with headquarters at 29 West Forty-second street, New York City, where it announced that catalogs may be obtained of all companies represented. It is further stated that the poster illustrates only one of the several models made by each maker.

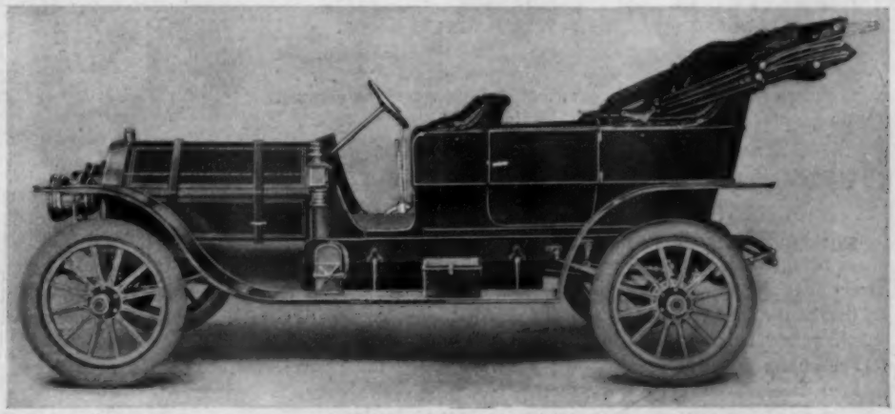
GEARLESS TO MAKE ITS DEBUT AT THE HUB

OWING to the fact that the show at the Hub usually marks the wind-up of the show season in this country, it is generally productive of a number of new things that could not be gotten ready in time to exhibit at the earlier shows. Two of these that will be uncovered for the first time during the event that will hold the boards for the week beginning next Saturday are the Gearless touring cars. Taken as a whole, both these cars are something in the nature of a novelty, as they have never been publicly shown before, and, in fact, have only been completed in time to be included in the Boston show, but their chief distinguishing feature—the gearless transmission—is something that has been before the trade for some time past and has demonstrated its utility in a satisfactory manner. In addition to this feature, they embody a number of novel points, which it is confidently expected will cause their entrance on the market to be something in the nature of a sensation to the trade. They are the result of two years' steady work and experimenting on the part of the Gearless Transmission Company, Rochester, N. Y., and will have the distinction of being the highest powered cars on the American market for the price. Their builders will have the further distinction of being the only manufacturers in the country devoting their attention to both the two and four-cycle types of engines, one of each of the cars to be staged being of these differing types.

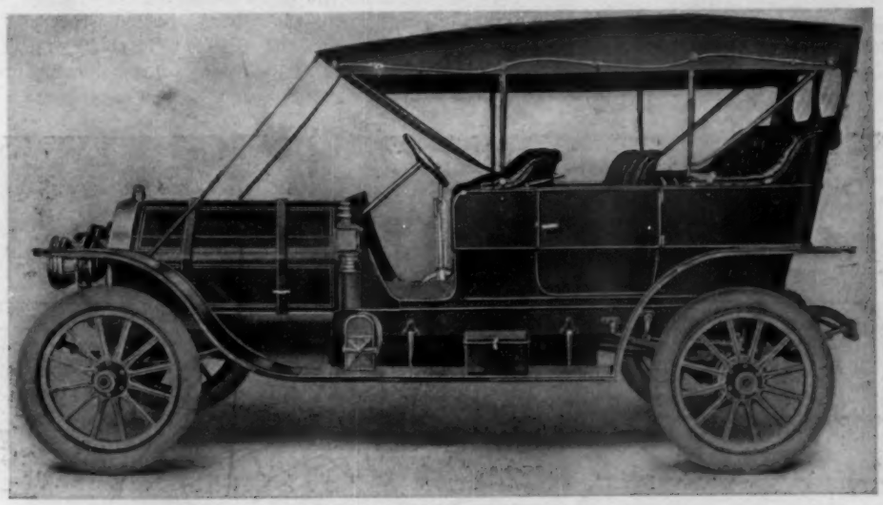
THE RADIATOR.

Model 60 is the two-cycle type and is a 60-horsepower car, equipped with a four-cylinder, two-cycle engine, the cylinders of which have a five-inch bore and five-inch stroke. Particular attention has been paid to the matter of ignition, and after much study both the plugs of the duplicate systems with which the car is provided have been placed at the side of the cylinder, quite close to the top, rather than directly in the head itself, as has been customary with the majority of designers. This location has been found to be one that insures the proximity of fresh mixture to the plugs and consequently facilitates the spread of the explosion, with a corresponding increase in the power developed. One set of plugs is run from a standard high-tension equipment, employing accumulators as the source of current, and the other set, entirely independent of the first, is run from a magneto. The motor has been demonstrated to have a capacity of fully 60-brake horsepower on the test block.

The makers are not ready to give full detailed information of the design of the engine at the present time, but wish it understood that it is a motor of the two-cycle type, free from those defects thought to be inherent in this class of engine. It is said to be extremely flexible and responds to the throttle to the same degree as a four-cycle motor. Another distinguishing feature of this car is the transmission, which, as already mentioned, is gearless, but which does not, however, employ any friction disks, its simplicity being such that but three moving parts in all are required. A full technical description of this will also be given in connection with that of the engine itself. The car has a 124-inch wheelbase, with 36 by 4-inch wheels, and in every respect embodies only those features of design, construction and materials that have come to be considered as standard by the best known designers.



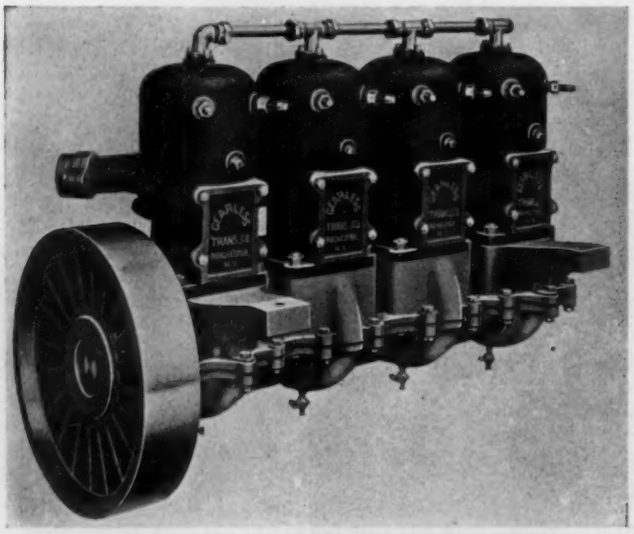
GEARLESS MODEL 60, WITH FOUR-CYLINDER, TWO-CYCLE MOTOR.



MODEL 75, GEARLESS, HAS SIX-CYLINDER, FOUR-CYCLE MOTOR.

The other car to be shown is no less a surprise, in that it marks an addition to the six-cylinder ranks. It is known as Model 75, its power plant consisting of a six-cylinder motor, the dimensions of which are 4 13-16 inches by 5 1-2 inches—an unusually large engine for one of the six-cylinder type, so that although its official title is as given above it will be popularly known as the "Gearless Great Six." The motor has a capacity of 75-horsepower at a moderate speed. As its name indicates, this car is also equipped with the gearless transmission described above, and is along the same general lines as the two-cycle car, except that it is somewhat heav-

ier in construction throughout, the wheel base being 128 inches and the wheels 36 by 4 1-2 inches. Both cars are provided with extremely attractive straight-line bodies, comfortably seating seven passengers in the case of the latter, extra revolving chairs



SIXTY-HORSEPOWER, TWO-CYCLE GEARLESS MOTOR.

being used in the tonneau. The 60-horsepower two-cycle car lists at $3,250 and the "Gearless Great Six" at $4,000, both in complete running order and with the usual equipment of accessories.

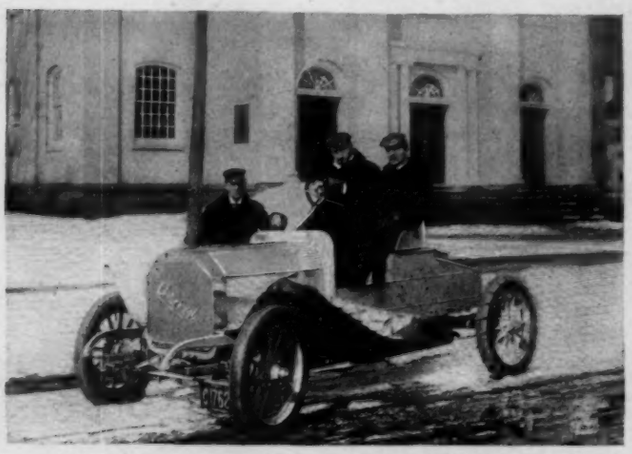
CHICAGO MOTOR DISPATCH'S ARRAY OF LOGANS.

CHICAGO, March 4.—Twenty model N Logan light delivery wagons are being used exclusively by the Chicago Motor Dispatch, these being received recently from the factory of the Logan Construction Company at Chillicothe, O. These cars are all painted in dark wine color, with gold stripes and lettering, consecutively numbered. Their appearance is businesslike.

The object of the Chicago Motor Dispatch is to handle parcels and packages accurately and rapidly in Chicago, the company consisting of five men of experience in the express business. The parcels are first called for by a force of pick-up wagons and taken to the Motor Dispatch's clearing house at 347-349 Wabash avenue, and there sorted for delivery to all parts of the city. Before the end of the year the Motor Dispatch expects to double its number of Logans, for the tributary business interests in Chicago express much satisfaction at the excellent service supplied by the motor route. John D. Maus, for nineteen years associated with Kelly, Maus & Co., is the president and general manager, the other directors being J. Brown, Jr., vice-president; Graham F. Duffield, secretary and treasurer; Ralph A. Bond, and Vincent Walsh, all of whom are experienced in this line.

CASWELL BECOMES HEAD OF INTERSTATE CO.

At its second annual election, held at the company's offices at 1931 Broadway, last week, Louis S. Caswell was elected president of the Interstate Automobile Clearing Company. The other officers are James Geary, vice-president; James M. Carples, secretary, and F. I. Hauptman, treasurer, the directors being William B. Thom, William E. Metzger, William J. Dixon, John Slattery, Herman F. Cuntz, Charles A. Wardle, James Geary, F. I. Hauptman and L. S. Caswell. In its operations this concern holds a unique position in the automobile field. It neither buys nor sells cars though its dealings are entirely in used cars. What it does do is to find buyers for those who wish to dispose of second-hand cars, and cars for those who wish to acquire one that has already seen service, thus doing a purely brokerage business, but covering the entire country. A registration fee is required to cover the cost of advertising and a small commission is charged the seller on the amount for which the car sells. Both buyer and seller are accordingly benefitted.



CONTINENTAL CAR AND DESIGNER JOHNSON.

THE NEW CONTINENTAL AND ITS DESIGNER.

One of the latest entrants into the field is the new Continental, a car of foreign design, which will claim New Haven, Conn., as its home. The photograph shows C. S. Johnston, its designer, at the wheel, about to start out on a 100-mile test over the snow-covered roads. With him in the new roadster is E. W. Bean, consulting engineer, and standing beside the car is S. R. Ryman, master mechanic of the University Automobile Company, of New Haven, which is undertaking the construction of the new car. This concern, of which Mr. Johnston is president, is also agent for the Wayne cars and expects to be able to supplement these with the new productions of his own creations in time to make deliveries for the coming season.

LOGAN LIGHT DELIVERY WAGONS, BUILT FOR THE CHICAGO MOTOR DISPATCH, READY TO LEAVE FACTORY AT CHILLICOTHE, O.

THERE WERE MANY SNOW COVERED MILES WHERE THE CAR WAS LET OUT INTO ITS GREATEST GALLOP.

THE SNOW-BLOWN STORY OF A WINTER TRY-OUT

By A. PASSENGER.

"HIRAM" was what we christened the 1908 Packard experimental car after we had braved the snow and the cold for a 606-mile round trip between Detroit and Chicago. "Hiram," or, as he was then known, "Number One," had scampered over the boulevards of Detroit for about a month, and there was considerable curiosity concerning his ability to trip over the nerve-wracking highway which connects Detroit with Chicago. A run was arranged. The pilot was Sales Manager Waldon, who has driven experimental Packards over that particular road of jolts and jars so often that he ought to be able to write a syncopated poem about it. Four of us of the proletariat constituted the ballast-pneumatic-tire Red Cross corps.

It was before 6 o'clock and the sun was still abed when we gathered at the Cadillac Hotel. Waldon's fur-framed face, as he burst into the warm lobby, was serious. Seated at the greasy table of an all-night dispenser of coffee, rolls and once-eggs, we talked over the chances of the road ahead of us. There was no recent report on which to build a prophecy of any kind and the only visible sign was a void of wintry desolation and darkness.

Michigan avenue was wrapped in a cold chill. It is fashionable now to listen to the "Call of the Wild," and make your friends think you are a regular wolf-dog, impatient to dash across the snow and through the ice-mantled forests. However, there is a yellow streak in a soul accustomed to steam heat when it comes to choosing between a fine hotel and a wind-swept snow road about five-fifty of a winter morning.

We Got Back to Nature.

Back to nature? We certainly got back that day and the next and the next. For the first few miles along the macadam leading out of town there was much levity. We discussed the car we were in and guessed at things to come. In the growing light we caught glimpses of ourselves in shop windows which shot rearward. It was not a pretty car and one would little think it the first impression cast in the mold of the future season. The body was passé by a couple of seasons, and fitted its frame much as some of our borrowed furs fitted ours.

A few hardly curious and very sleepy early risers watched us rush out of town. We fidgeted around in the tonneau, adjusting our bulky shapes and the paraphernalia of touring which reposed on the floor. We divided the task of record keeping into looking at the speedometer, at a watch, and at making marks on a 5-cent note book. Soon we settled into the half slumber that follows too early awakening and let the vigilant Waldon study the long stretch of tiresome perspective leading into farm land.

The cold brought us back to life. The day was full born but gray and drear. We were apparently alone on the face of the earth. Waldon said it was our duty, in the tonneau, to wave at all farmers we met. We looked hard for farmers to wave at. The watchkeeper hunted in his voluminous clothes for the timepiece that he might note our arrival at a town. His right fur mitten was picked up by the wind and carried overboard. Waldon laughed and we flew onward. A mile further down the road I lost a mitten trying to write Ypsilanti in the note book as we jostled along about 55 miles an hour.

A Panorama Painted by Jack Frost.

We were in real farmerland now. Rolling ground gave us a wide panorama painted by Jack Frost in blinding white. The snow was on everything but us. Only in the far distance, where irregular lines of trees rose to partially obscure the horizon, was there anything not white. The sun flirted shyly with the landscape and cast opaline pictures upon the great white screen. It did not warm except in appearance. The cold penetrated with a sharpness that cut through fur and sweater. We began to hunt for the warm corners of the tonneau. There was great simplicity and beauty in the wonderful white vista before us. But even the crisp crunching of dry snow under our flying wheels lost its music and became the chant of a frozen elf who tormented us.

The sun lost itself behind a bank of grey evil clouds. The opals vanished. The snow deepened. The houses seemed farther apart, forlorn, deserted. Everything was bleak. Hills rose and sank as the road climbed icy, wind-blown summits and dropped into uncertain hollows where the snow might be a foot or a mile deep. We wallowed in the drifts and slid over the slippery, rough swept places. The wind beat the drifting snow against our faces. It felt like the sharp prick of a thousand needles and often we would touch our faces as though to wipe the blood away. Waldon told a funny story. I never knew whether this was a bluff or whether he was really immune to the gale of snappy frost.

The Road Was Ours Alone.

It was time that we should meet the pious farmers on their way to the country church. We did not meet them. The road

MORGAN. FREDERICKS. WALDON. LOOMIS. ESTEP.

was ours. Rural Michigan worshiped by its own cook stove that raw Sabbath day. We could not guess at the time. The sun shone from nowhere. Only occasional glances at the watch as we passed through towns guided our calculations of the day's progress. The speedometer told us that we were reeling off mile after mile at express speed; for all that we slid on the ice and struggled rudderless in the snow.

At Coldwater we took on gasoline for safety's sake, although there was plenty in the tank and we had a ten-gallon can in the tonneau. We stretched our legs and clapped our hands and stumbled and rolled into the hotel to get rid of a little of the sting before we started again.

All that morning and in the afternoon the flight across the drear waste of a snow-buried country continued. We ran through an area where it had melted, but was now freezing again. The cold was augmented by our windy dash through it. A dirty mixture of sand, clay, and melting snow was hurled up at us in a constant stream, striking car and passengers alike and freezing where it struck. Soon we were ice-coated fom end to end, enameled in fozen mud. The steering was difficult now. Not only was the pathway fickle, but the steering gear was encrusted with ice and its lubricating grease frozen into solder.

Struck the Deep Drifting Snow.

As we worked our way out of this district of slush we struck again the deep drifting snow. The road was buried. Only the trees and the fence tops outlined the highway. There was one long wavering stretch which I remember, where it seemed as though we were striking across a desert or that we were on top of some once-inhabited region now buried beneath its great burden of snow. We ran into a valley and crossed and recrossed the St. Joe river. The bridges creaked and groaned. The trees along the low edges had been inundated. The water was gone but had left a collar of ice around each tree. The only simile I could think of was the immaculate ruff of Sir Walter Raleigh. That reminded me that I had not smoked since leaving Detroit. By blowing the smoke through my nose I discovered that I could warm the whole front of my face.

Pretty soon the landscape lost its wild, frozen charm and became human with brick pavements, trolley wires and houses with lace curtains. It was Elkhart, but Waldon never hesitated. There was a momentary warm breath and then once more the icy blast of the open country struck us. We nearly passed a corner that should be turned. The steering was now frozen so stiff that both of those in the front seat had hold of the wheel. They yanked and tugged at it. The car came round but came too slowly. Then we stopped—in a snow drift a few feet deep by a fence. We kicked the snow around and shoveled it out with a corset sign that belonged on a fence in a warmer clime.

Once more on the road, we sank again into reveries and our furs. Waldon and his companion of the front seat struggled with the wheel but did not let up on speed.

Bang! We Knew That Sound.

Bang! We came up out of our furs and our reveries. We knew that sound. There may be the stimulus of excitement when changing a tire in the Vanderbilt Cup race. You never really curse the rubber industry in your heart until you fix a tire on a snow-drifted, windy country road.

We were close to a house and drove the car into its yard, where we started to work on the lee side of a hen-coop. This small protection was but a frost-bitten farce, so we drove into a brick yard further back. Here we found four walls of red brick, just baked and pretty. There was no roof, but there was charcoal. We borrowed it and made a fire.

While part of the crew put in a new inner tube the rest of us heated irons which we found and, after knocking off the mud encrusted on the steering gear moving parts, thawed out the frozen bearings and got the car so it handled with its usual agility. We recommenced our journey warmed, good-natured and only a little delayed. We had been making good time all the morning, and were now somewhat used to the cold and felt the importance of our ride in this, the first 1908 car. But hardly had we started when there was symptom of fuel trouble. In other words, the engine stopped. Back into the brick yard, and we heaped more charcoal on the dying fire. Investigation showed that, during the tire repair, water which had been in the gasoline had frozen in the small filter-well below the carbureter float chamber and in the lower gasoline pipes.

Had Eaten the Last Sandwich and Pickle.

While we thawed out the frozen parts the afternoon became more gloomy with each departing minute. The sun had not been seen for hours, but we knew it was sinking behind the great streaked fresco of dull grey and ochre that told which was west. We were hungry. Long since we had eaten the last sandwich and the last dill pickle. We struck the brickmaker's house for supper and got it. Sitting around that kerosene-lighted table; our faces unwashed and streaming with melting mud; our clothes, eskimo-like in their rotundity; our furs steaming on chairs and making pools of water on the white kitchen floor; three men, the tired wife of one of them, and a little girl eying us curiously as they made a hesitating bluff at swelling the conversation, we almost became sentimental.

We figured over the chances of making Chicago that night. Ingenuous Fredericks called our attention to the fact that the hotel at South Bend was one of the finest in the West. The hint was laughed at, but finally acted upon. The road had been a tiring one to drive by day. It was a dangerous one to drive by night. At the Oliver we washed our abused faces with vaseline, and then went to bed—there to toss and dream for a few brief hours of snow and ice, punctured tires, brick yards and fleet miles.

The next day was not so arduous. The cold still fought our wraps and succeeded fairly well in reaching the channels of our sporting blood. But the sun was in and out among the cumulus clouds that stood in bold relief before the sky of baby blue which belied the weather. The roads were smoother now, for we were in a region which Hoosier farmers had macadamized.

We were welcomed at Hobart by a carful of Chicagoans, and we raced the '07 and the '08 over the glossy dangerous roads.

We Did Not Stop at Chicago.

We did not stop at Chicago nor even get out of the car, but started back for South Bend and reached it in mid-afternoon.

Immediately we fell to on the first square meal we had had since Detroit. In the evening we regaled the garage man and some of his friends with our experiences and with tales of other cross-country chases made by Waldon.

The following morning, as we lined up at the long counter of a restaurant with a "Never Sleep" sign, we knew that it was colder than either previous day. But we were by this time veterans, and we dashed out of South Bend with that renewal of form which always accompanies the beginning of the last lap. Waldon at the wheel must have felt it too. We in the tonneau raved about the frozen scenery along the St. Joe. We talked about previous and summer rushes over this Chicago-Detroit road and calculated the chances of smashing Waldon's round trip record of 22 hours 50 minutes, or 20 hours 36 minutes running time. We were gay and giddy. So excellent had proven the riding quality of the new springs that we were bumping over the rough roads as though on a cup race course. "Thank-ye-marms" we laughed at, but, of a sudden, we all hit the sky together and nearly missed the car when we came down. The cause was one of those combination cross ridges and depressions which some farmers imagine are necessary to prevent hill roads from washing out. A quick, sharp snap told of a broken spring, the left front one. The top leaf was gone near the axle clips. We drove along carefully for several miles until we espied Mottville, in Michigan, which has four houses, one blacksmith shop and a general store.

We welcomed the blacksmith shop and were welcomed by it. Mr. Mott was genial and a good smith. We needed strap steel to fix the spring and hunted through a pile of scraps beneath a bench until we found two pieces a couple of inches wide that would just serve our purpose. Mr. Mott laid them on the anvil, put the cutting hammer on the spot we indicated and with a savage blow of the knocking hammer cut the piece in two. He marked the other and raised the hammer, but stopped with it poised mid air, and ejaculated:

"By catnip! If them ain't those there gosh-blamed irons that Hi Smith brung in to fix up his plaow with!"

It was surely a "horse" on Hi, and it inspired us. That was the name of which we had been trying to think—true of the country, a name fitting this unnamed car which for three days had struck about as close to the heart of the countryside as you will ever get in an automobile. So we christened it—properly, with a half-empty bottle of chill-eradicator.

Backing out of the "Mottville Garage," a front wheel hub caught on the corner of the anvil and the aluminum hub cap was broken off. We stuck the garage tin cup over the end of the hub, wired it on and were soon away down the road.

It started to thaw about noon, and then to freeze again, so that we got a third layer of that conglomerate mass of chill thrown up from the road. We saw the places where, on Sunday, we had splashed mud all over the clean white sheets along the sides of the roads. We saw, in cold storage by the wayside, a chicken we had hit. We met a chicken that was alive until then. Afterward the speedometer stopped, but we did not learn the cause until we reached Detroit and looked at the front of the car. Then we found that the chicken had been traveling *in-cog.*

It was about 3 o'clock when we struck the center of Detroit and turned onto the boulevard for a final burst of speed. It was just as cold as ever, but we turned down our collars, primped a bit generally, and tried to look swagger as we drove to the factory home. There Waldon steered the car on the elevator, we were hoisted to the second floor, and ran, mud and all, into the experimental room, where nearly all the factory jokers gathered to pass comment on our appearance and ask leading questions concerning the weather, roads, and all the rest of it. It had been a great ride, but only the first. The car and three others, now being made, must go more miles—miles by the thousands—that qualities which are new may be tested on the rough road before they become standard. Even now is "Hiram" wallowing in the melting-freezing mud between Detroit and Cleveland under the guidance of Russell Huff, chief engineer—while Loomis sits in the warm drafting room figuring the price of a new pair of mittens on his wonderful guessing stick.

A GLIMPSE INTO ONE OF THE DEPARTMENTS OF THE IMMENSE NEW FACTORY OF THE GEORGE N. PIERCE COMPANY AT BUFFALO, THE PIERCE GREAT ARROW IS MADE.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

W. H. Hotchkiss, president of the American Automobile Association, has just made his choice of an automobile for 1907. It is a Thomas Forty touring model.

The Fish Automobile Company of St. Louis, Mo., has given up the old McGirt foundry on South Center street and has moved to the Apex Manufacturing Company's building.

Several Fort Wayne capitalists are interesting themselves in the probable establishment of an automobile factory in that city to be run as a branch of the Buckeye Manufacturing Company, makers of the Lambert, at Anderson, Ind.

Pleased with past results, the Studebaker Automobile Company will fit every 1907 car with the Truffault-Hartford shock absorber, and has just completed the necessary agreement with the Hartford Suspension Company.

A receiver has been appointed to take charge of the affairs of the Clarke Automobile and Launch Company, of Jacksonville, Fla. The petition and bill filed by D. H. McMillal states that the company is hopelessly insolvent.

The exact location of the new factory which the Rainier Company will build in some Middle Western city has not yet been decided upon, despite reports to the contrary. Detroit was mentioned erroneously as having been the selection and a factory site acquired.

A new line of Oval horns in various sizes and of very deep penetrating tone has been placed on the market by the Automobile Supply Manufacturing Company, of Brooklyn. These horns have met with such approval that the company's two factories are working overtime to meet the demand.

The Pennsylvania Railroad Company is now experimenting with automobile baggage trucks for use in the Union station at Pittsburg. They are of extra heavy construction, and can be run by merely touching a button. Four are now employed at Philadelphia, and have proved such time-savers that the authorities think it is profitable to extend their use.

William H. Mead, manager of the Chicago branch of the Buick Motor Car Company, has leased the entire second floor of the Winton building, at Michigan avenue and Fifteenth street, and will use it for retesting and reshipping Buick cars to the out-of-town agents within his jurisdiction. Owing to the extension of business ground has been secured for the erection of a new building just south of the Franklin agency on automobile row.

Although the H. H. Franklin Manufacturing Company has just completed a five-story addition, it is apparent that more space must be secured, and arrangements are being made for obtaining additional room in other buildings in the near vicinity. The fact that the company must provide for the output of the commercial vehicle department is a consideration of the near future demanding additional space, which is not obtainable in the present factory limits.

A dealers' association is under formation by the automobile trade of the Newark, N. J., territory. At a recent meeting the matter was thoroughly discussed and a committee appointed to consult the automobile trade and create an interest in the project. This committee consists of James W. Ward, C. S. Calvert, Frank E. Boland, Raymond S. Joo, W. H. Rickey, Frederick Hinni and John Beldon. All members of the automobile trade will be eligible for membership.

An involuntary petition in bankruptcy has been filed against the Four Wheel Drive Wagon Company, of Milwaukee, Wis., by three creditors, the Rundle & Spence Manufacturing Company, Siekert & Baum Stationery Company, and the Cream City Can Works. The petitioners allege that the company admitted its insolvency January 1, and signified its willingness to be declared bankrupt. The liabilities are said to be $190,000, and its assets $101,500. The company has not operated its plant for two months.

To visit the mammoth new factory in which the White steamers are made, Carl Page ran a "personally conducted" tour to Cleveland last week, in which twenty of his associates from the various White garages in the New York territory participated. The party chartered a private car which was attached to the Lake Shore Limited. Arriving in Cleveland in the morning, they were met by Walter C. White and a squadron of White cars, and were driven to the Union Club for breakfast. Practically the entire day was spent in inspecting the new factory. At the close of the day the White private car was attached to the Pennsylvania Limited, and the party returned to New York, more than ever impressed with the fact that they were a part of one of the great industrial organizations in the country.

Although his plan to create a convincing piece of advertising literature, extolling the Autocar, miscarried through no fault of his own, Fred P. Brand, general sales manager of the company, gained a new slogan. The Autocar is now "the car that takes you there and brings you back." Mr. Brand thought a booklet of testimonial letters from some Autocar users would be interesting, and communicated his ideas to the Autocar agents throughout the country. As a result, he was fairly overwhelmed with letters, more than 500 being received, making it out of the question to use all or even give a fair idea of the number sent in. So many of the writers concurred in calling the Autocar "the car that takes you there and brings you back" that the coincidence was striking.

In the new Columbia four-cylinder gasoline car with electric transmission, which attracted so much attention at the New York and Chicago shows, the revolving field generator serves the purpose of a clutch and transmission, the full driving effort being exerted by the engine directly to the driving pinion. The driving shafting extends along the center of the frame to the rear axle and three ball bearings are the only frictional parts between the engine and the rear axle. Owing to the elimination of the friction incident to the ordinary types of transmission, the hill-climbing powers of this car are remarkable, and its adaptability to the varying conditions of road traffic, owing to the ease of control and simplicity of the entire apparatus, makes it considerably faster than its 45-horsepower rating would indicate.

NEW AGENCIES ESTABLISHED.

The Bartholomew Company has contracted with W. J. Brown, of Wellman, Ia., for the sale of the Glide in Washington and Keokuk counties.

A Haynes agency has been established in Brooklyn, N. Y., with the Borough Automobile Company, on Palmetto street, near Bushwick avenue.

The Chicago agency of the Detroit car has been placed with the Garfield Park Automobile garage, of 1891 West Harrison street.

The Eclipse Automobile and Construction Company has opened a large garage at Williamsburg, N. Y., in the former Empire Theater building. The agency for the Smith machine is located here.

The new California automobile, the Tourist, built by the Auto Vehicle Company, of Los Angeles, is now being handled in San Francisco by the Auto Company of California.

The latest addition to Philadelphia's automobile agencies is the Philadelphia Motor Car Company, now located at 236 North Broad street. The new company represents the St. Louis Motor Car Company, of Peoria, Ill.

Alfred Reeke, who for the past few years has been treasurer of the Orlando F. Weber Company of Chicago and Milwaukee, severed his connection with that concern on March 1 and has arranged to open an agency of the Wayne Automobile Company of Detroit, in Milwaukee.

RECENT BUSINESS CHANGES.

The Central Manufacturing Company, of Connersville, Ind., manufacturing buggy and automobile bodies, has voted an increase of its stock from $50,000 to $100,000.

The Toronto Automobile Company, located at 10 East Adelaide street, Toronto, has absorbed the Automobile and Supply Company (George H. Gooderham). The latter's garage and show rooms will be continued and the new premises closed up.

The partnership between Palmer & Christie has been dissolved and a new company formed under the title of the Martini Import Company. The directors are F. B. Palmer, C. F. Palmer and Joseph B. Freeman. Martini cars will be handled exclusively. The salesrooms of the company will remain as before at 239 West Fiftieth street.

D. D. Martin, general manager of the New York-Broadway Rubber Tire Company, located at 1186 Bedford avenue, Brooklyn, has removed his entire tire department to the second story of the building, and on the ground floor installed a complete line of accessories and supplies in charge of James F. Fairman,

recently with Smith & Mabley, Inc., of New York.

The O. H. Dietrich Company, Ltd., of Allentown, Pa., has been incorporated under the name of the Dietrich Motor Car Company, with garage and salesrooms at 24 and 26 North Tenth street. Twenty-five thousand dollars is the fully paid in capital of the company. The officers are: President, G. J. Heintzleman; secretary and treasurer, O. H. Dietrich; directors, O. H. Dietrich, G. J. Heintzleman, Valentine Guldin and William T. Leh. Franklin, Cadillac, Buick and Thomas cars are handled.

PERSONAL TRADE MENTION.

Joe E. Yowell has been appointed manager of the Southern Automobile Company, of Nashville, Tenn.

F. C. Hoblitt, formerly of the Aerocar Company, Detroit, has become connected with the American Locomotive Motor Car Company, Providence, R. I.

Charles Coddington, for some time manager of the Southern Automobile Company, has left that concern to take up the management of the Capital City Automobile Company, of Atlanta, Ga.

James G. Heaslett, formerly of the Garford Company, of Elyria, O., has entered the employ of the Rainier Company, of New York, as chief engineer and designer.

THIRTY CARLOADS OF BUICKS.

What is probably the largest single shipment of automobiles ever made is depicted in the illustration herewith of one train load of Buick motors under shipment to the Pence Automobile Company, Minneapolis, Minn. There are thirty carloads in the train, consisting of ninety automobiles, the total valuation of which is $112,500. Big as it is, the shipment constitutes less than one-third of the total number of cars ordered by the above named company, their total allotment for the season being three hundred, made up of two hundred and fifty two-cylinder models and fifty four-cylinder models. The Buick Motor Company factories are all working to their full capacity, and extensive building operations are under way at Flint which will double the capacity at that point. Among other important additions there is to be a new drop forge plant and a plant for malleable castings. These will be ready in time for the 1908 business.

TRADE PUBLICATIONS RECEIVED.

The latest folder from the H. H. Franklin Manufacturing Company, Syracuse, N. Y., describes type G Franklin runabout, a smart-looking little twelve-horsepower machine which, as the folder has it, "suits the highest runabout ideal like a glove."

From the Berkshire Automobile Manufacturing Company, Pittsfield, Mass., is to hand a sixteen-page handbook on that firm's Model D touring car. The history of the machine and its distinctive features are related in text and cuts, gotten up in the neatest style.

Garvin motor-driven machine tools are illustrated and described in the unpretentious little booklet issued by the Garvin Machine Company, of New York City. The list here given is not exhaustive, but it shows the most important models handled by this firm in plain milling machines, vertical spindle milling machines, hand drilling machines, Garvin profilers, die slotters, automatic tapping machines, and hand lathes.

There is a considerable amount of useful information in the booklet bearing as its title "Clinchers" and issued by the Continental Caoutchouc Company. It gives sizes of tires in American and metric measurements, prices, history of the Continental firm in its native city of Hanover, Germany, and its doings in its adopted land, as well as a list of agencies throughout the world. There are some useful hints on the care of tires, weights which various size tires will carry, and information on the making of temporary repairs. Any automobilist can secure a copy of the booklet on request to the Continental Caoutchouc Company, 2100 Broadway, New York, or their various branches.

There is some interesting reading in the neatly produced booklet by Frank P. Illsley on the "Six-Cylinder Situation in Europe." It contains a large number of clippings from European automobile journals, and from the European correspondents of American motor papers, on the six-cylinder situation. For the man who has not had time to study the six-cylinder proposition and who is not well acquainted with what is being done in this line of motor construction, the booklet provides useful up-to-date information. The Stevens-Duryea Company has something to say on its share in the six-cylinder movement, but the compiler of the brochure has sought rather to give information on the subject in general than beat the big drum for any one firm.

The "International Girl," a copyrighted reproduction from the original painting by Abbey Alston, is the attractive headpiece of the International Rubber Company's (Milltown, N. J.) publication on tires. The literary work of the booklet is a setting forth of the qualities of International tires and their methods of construction. A price list of International tires is included in addition to a table showing the carrying weights for different size tires. From the same company has been received a life-size reproduction in colors of the painting—the "International Girl." It is a well-produced piece of color printing, and doubtless members of the trade will be glad to avail themselves of the offer of the International Rubber Company and obtain the hanger on sending twelve cents in stamps to cover postage.

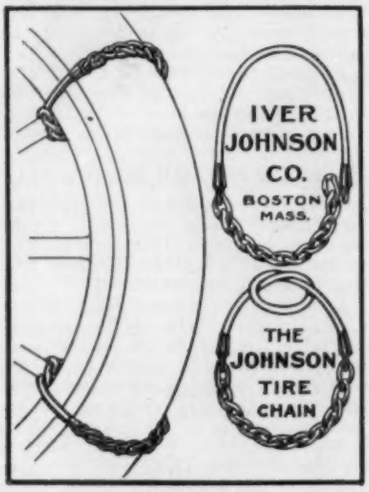
ELCO MOTOR BOATS.

Probably there is no better known make of motor boats along the entire Atlantic Coast from Maine to Florida than those which bear the "Elco" mark. Not being wedded to any particular school or system, their builders, the Electric Launch Company of Bayonne, New Jersey, are impartial advocates of steam, gasoline and electricity and are well known as the creators of exclusive designs using each power, a large number being in service round about the waters adjacent to New York. Their name has become more closely associated during the past few years with the speed type of boat—more popularly styled the automobile boat, in that it has been designed with a view to rendering about the same class of service on the water as the automobile does on land. These boats are built in sizes ranging from 26 to 40 feet over all, are equipped with the standard multi-cylinder type of automobile motor of the latest design and of powers sufficient to give speeds ranging from 15 to 30 miles an hour. The engine is placed forward under a hinged hatch, permitting of ready accessibility to every part and leaving the entire cockpit free for seating room, which is generally taken advantage of to use wicker arm chairs. This firm has become even better known as builders of speed launches and large cruising yachts, after the plans of some of the best-known yacht designers—boats that have become famous for their performances in contests or for the luxury and ingenuity displayed in their arrangements and equipment. They are about the only builders who have made a specialty of electric launches, to which they have devoted considerable of their attention for quite a number of years.

RECORD SHIPMENT OF BUICKS EN ROUTE FROM FACTORY AT FLINT, MICH., TO MINNEAPOLIS, MINN.

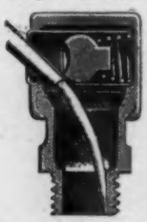
INFORMATION FOR AUTO USERS.

Tire Chains.—The Johnson Tire Chain is designed to supply the demand for a light weight and low-priced device that will prevent loss of traction in snow, sand and mud. There are no side chains. The other members, however, hold the traction members in operative position, each being a unit, held in position by the spoke. This construction does away entirely with any trouble resulting from the failure of any one part. Owing to



the peculiar method of fastening to the spoke, all side and other slipping is effectually prevented, giving a unit structure that is self-retained in such a manner that no part is lost when any member is worn through by use. This is the only chain traction device that can be readily applied without either jacking up or moving the car, thus making it a very simple matter to apply in emergencies, such as being hung up in the mud, snow or sand spot. It has been shown by actual practice that six of these chains on each rear wheel give sufficient traction for all ordinary work, although twelve can be used, or one to each spoke. As they are easily and quickly applied, they may be carried in the tool box, and used only when necessary, in this way saving much wear, and removing every excuse for leaving the same on wheels when the roads are good. It is made in sizes adapted for all tires from 2 1-2 to 5-inch, and, as it is designed to fit loosely, does not injure the tire.

C. F. Tucker, Hartford, Conn.—Dust and grit are such penetrating substances that they will find their way into any unguarded oil hole on the car, no matter how small it may be, nor how well pro-



CROSS SECTION OF TUCKER VALVE.

tected it appears to be. Moreover, the rapid motion, particularly of any revolving parts, tends to throw the oil out, so that it is impossible to keep a supply of oil on such parts. The necessity for continually digging mud and sand out of such holes every time it is necessary to oil them, is a nuisance, and to avoid it, as well as to protect the bearing, a device such as the Tucker oil hole cover and cup, which has been on the market a number of years, should be employed. As will be seen in the cross-sectional illustration, these cups screw firmly into the oil hole and are provided with a filler vent at the side near the top, which may readily be opened by revolving the top with a screw-driver. They hold sufficient oil to lubricate such bearings as they are required for many hundred miles, and not only stay where placed, but add to the appearance of the car.

Cushion Springs for Autos.—One of the first firms to enter into the manufacture of cushion springs for automobiles in this country was the Charles Wing Company, of Amesbury, Mass. The company is now making a specialty of the "Wing" cushion spring adapted for all descriptions of vehicle seats, but specially suitable for automobiles. The cushion spring is strongly constructed, makes a very easy riding seat, and stands up under hard usage and heavy strain. A full line of auto trimmings is carried.

Improved Oil Can.—In addition to the barrels, half barrels, and five and ten-gallon cans of lubricating oil, the A. W. Harris Oil Company has now on the

market a very desirable one-gallon decorated package which has what is known as the coalhod spout with screw cap. This addition, the usefulness of which will be appreciated by all who have filled an oiler from a large can, is also used on the five and ten-gallon cans. The one-gallon package is particularly handy for both the individual user and the retail trade.

C. F. Iszard, Germantown, Philadelphia, Pa.—Despite the great number of speed and distance-recording devices that has been placed on the market during the past few years, none had been devised to produce a continuous record until the appearance of the Recording Auto Speed Meter, the mechanism of which is illustrated by the accompanying illustration. The operating mechanism is the same as that ordinarily employed, i.e., a striker revolved by one of the front wheels and a flexible shaft. A clock movement is supported on a stationary shaft, around which it revolves, carrying a drum holding the record sheet. The clock is geared to revolve four times in twenty-four hours, and is so mounted that each revolution causes the record chart to move horizontally a quarter inch, making the record of each period of six hours entirely distinct. Mounted in the center of the gear is a shaft, having at its end a cam engaged with a pen lifter, so that at the completion of each mile the pen drops and records it. This gear can be disengaged and turned by hand so that the machine may be set at

IZARD RECORDING SPEED METER.

the starting point whenever desired. The fountain pen holds sufficient ink for a week's running and is of non-corrosive metal; it is suspended on a flexible band, so that no amount of jarring causes it to make a false record or spill the ink. The construction throughout is made very rigid, so that the jarring cannot disturb the clock movement or derange any of the mechanism. The inclosing case is either of mahogany or aluminum and its outside dimensions are only 5 by 4 by 3 inches, requiring but a small space on the dash. It is the invention of C. F. Iszard, and is patented.

An Improved Breast Drill.—Quite a number of new and valuable features have been embodied in the improved universal breast drill, placed on the market by Patterson Brothers, 27 Park Row, New York. It has a chain feed attachment, operated by the supporting handle, allowing pipes and similar articles to be drilled with ease. It can be ad-

IMPROVED UNIVERSAL BREAST DRILL.

justed to any angle, making it indispensable for automobile working. The sweep of the handle can be adjusted, and when limited space does not allow a full turn of the handle the ratchet is used. It is provided with two speed gears.